

# PRINTER: EPSON® MX-100



TECHNICAL SERVICE DATA FOR YOUR PRINTER

## PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of printer malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

Replacement or repair of the AC Switch Board, Control Board, Driver Board, Function Board, or connectors may be necessary after the malfunction has been isolated.

## GENERAL OPERATING INSTRUCTIONS

### PRINT STATUS (SW1) AND LINE FEED STATUS (SW2)

SW1	On	Off
1	Compressed	Normal
2	Not Used	
3	Paper Out Sensor On	Paper Out Sensor Off
4	Italic	Normal
5	Emphasized	Normal
6	Buzzer On	Buzzer Off
7	Slashed Zero	Regular Zero
8	Select Fixed	Select Not Fixed
SW2	On	Off
1	Not Used	
2	Not Used	
3	Auto Line Feed with Carriage Return	Line Feed from Host
4	One Inch Skip Over Perf	Normal (No Skip)

### PRINTER SELF-TEST

To use the built-in self-test function, put paper in the printer and hold down the LF (Line Feed) button while turning On the printer.

### ON LINE, FF AND LF BUTTONS

Printer is On Line (Ready to receive data from the computer) when all three green LED's are On.

The printer is Off Line when only the top green LED is On.

Pressing the On Line button once puts the printer Off Line and pressing it again puts the printer back On Line.

The printer must be Off Line for the FF (Form Feed) and LF (Line Feed) buttons to function.



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# PRELIMINARY SERVICE CHECKS (Continued)

## SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM, PLACEMENT CHART, AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED

### ① PRINTER DEAD

- (a) Check Fuse F1. If bad, disconnect the Power Transformer (T1) connectors CN2 and CN7. Check for shorted windings or shorts from the windings to the chassis. Replace Transformer T1 if bad.
- (b) If Transformer T1 is good, disconnect connector CN6 (On Control Board) and check the Regulator Transistor (Q6) with a transistor tester. If Transistor Q6 is good, replace or troubleshoot the Control Board and the Driver Board.
- (c) If Fuse F1 is good, apply AC power and check for 120VAC at pins 1 and 2 of connector CN7. If 120VAC is missing, check the AC Power Cord (P1) and Master Power Switch (SW10).
- (d) If 120VAC is present, disconnect connector CN2 and check the following AC voltages on the secondary windings of Transformer T1 at connector CN2. 9.83VAC at pins 1 to 2, 25.8VAC at pins 3 to 4, 10.33VAC at pins 5 to 6 and 16.63VAC at pins 7 to 8. If any voltages are missing, replace Transformer T1. If the voltages are good, replace or troubleshoot the Control Board and the Driver Board.

### ② WILL NOT RECEIVE DATA FROM COMPUTER

- (a) Check Microcomputer IC (1C) and Interface IC (8B) by substitution.

### ③ PRINT HEAD WILL NOT PRINT

- (a) Remove power. Check resistance of the print head solenoids from pin 7 of connector CN10 to pins 1 thru 5 and 9 thru 12 of connector CN10 (23 ohms each). If bad, replace the Print Head (H1). If good, check the connections and wiring from connector CN10 to connector CN6 (On Driver Board).
- (b) If the connections are good, check the Interface IC (8B) by substitution.

### ④ PRINT HEAD HAS MISSING DOTS

- (a) Check the print head solenoid resistance (23 ohms) of the solenoid producing the missing dot (See Wiring Diagram). If the solenoids check good, remove the Print Head and check the print head wires for possible damage.
- (b) If the print head is good, check the Microcomputer IC (1C) and Interface IC (8B) by substitution.
- (c) If the IC's are good, replace or troubleshoot the Control Board and the Driver Board.

### ⑤ PAPER FEED AND TIMING BELT MOTORS DO NOT FUNCTION

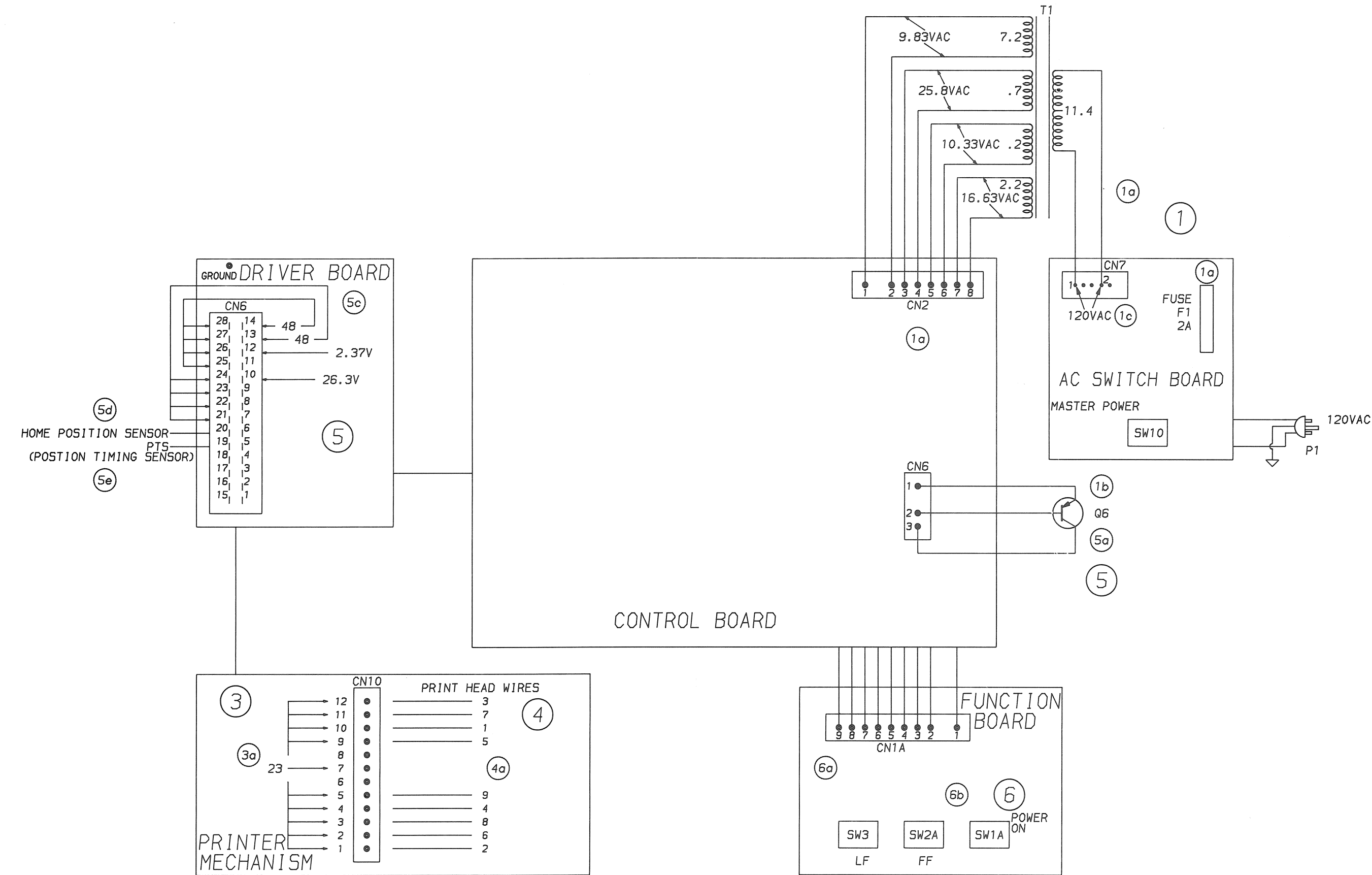
- (a) Check for 26.3V at pin 10 of connector CN6 (On Driver Board). If 26.3V is missing, remove power and check the Regulator Transistor (Q6) with a transistor tester. If Transistor Q6 is good, replace the Control Board or troubleshoot the power supply section on the Control Board.
- (b) If 26.3V is present, check the Microcomputer IC (1C) and Slave Microcomputer IC (9B) by substitution.
- (c) If IC's 1C and 9B are good, remove power and check the resistance of the motor windings (48 ohms each winding). Check the Timing Belt Motor Assembly C (M1) from pin 13 of connector CN6 (On Driver Board) to pins 21 thru 24 of connector CN6. Check the Paper Feed Motor Assembly A (M2) from pin 14 of connector CN6 to pins 25 thru 28 of connector CN6.
- (d) If the motors check good, check the Home Position Sensor (PT1) by monitoring pin 20 of connector CN6 (On Driver Board) with a logic probe while sliding a piece of paper in and out of the slot in the Home Position Sensor. The probe should read low with the paper out of the slot and high with paper in. If the readings are not correct, check for 2.37V at pin 12 of connector CN6. If 2.37V is present, replace the Home Position Sensor (PT1). If 2.37V is missing, replace or troubleshoot the Driver Board and the Control Board.

### ⑥ FUNCTION BOARD BUTTONS HAVE NO EFFECT

- (a) Check connector CN1A for good connection.
- (b) Remove power and check contacts of Switches SW1A, SW2A and SW3 (On Function Board) with an ohmmeter.

PRELIMINARY SERVICE CHECKS (Continued)

PRELIMINARY SERVICE CHECKS (Continued)



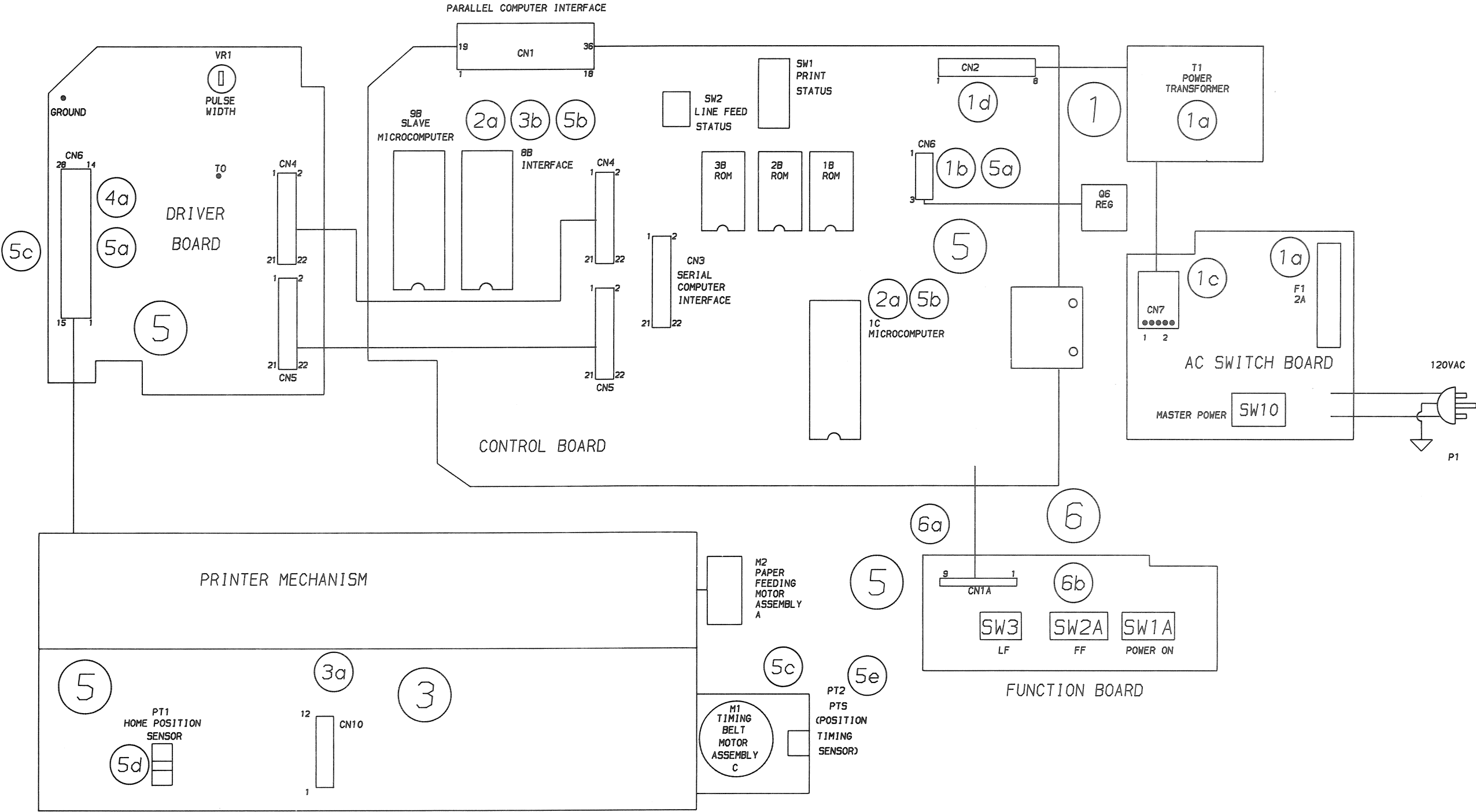
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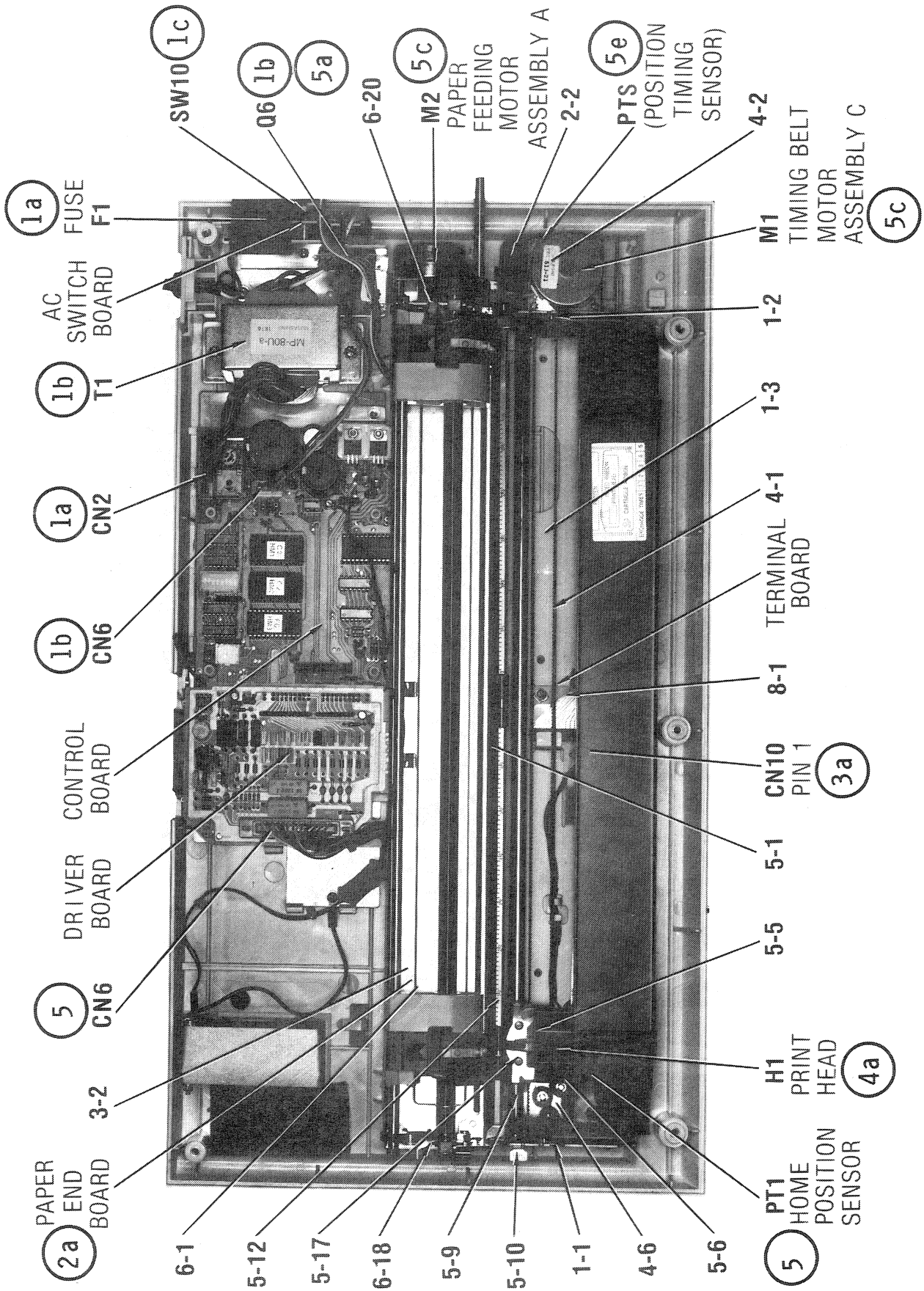
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PRELIMINARY SERVICE CHECKS (Continued)



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# PRELIMINARY SERVICE CHECKS (Continued)

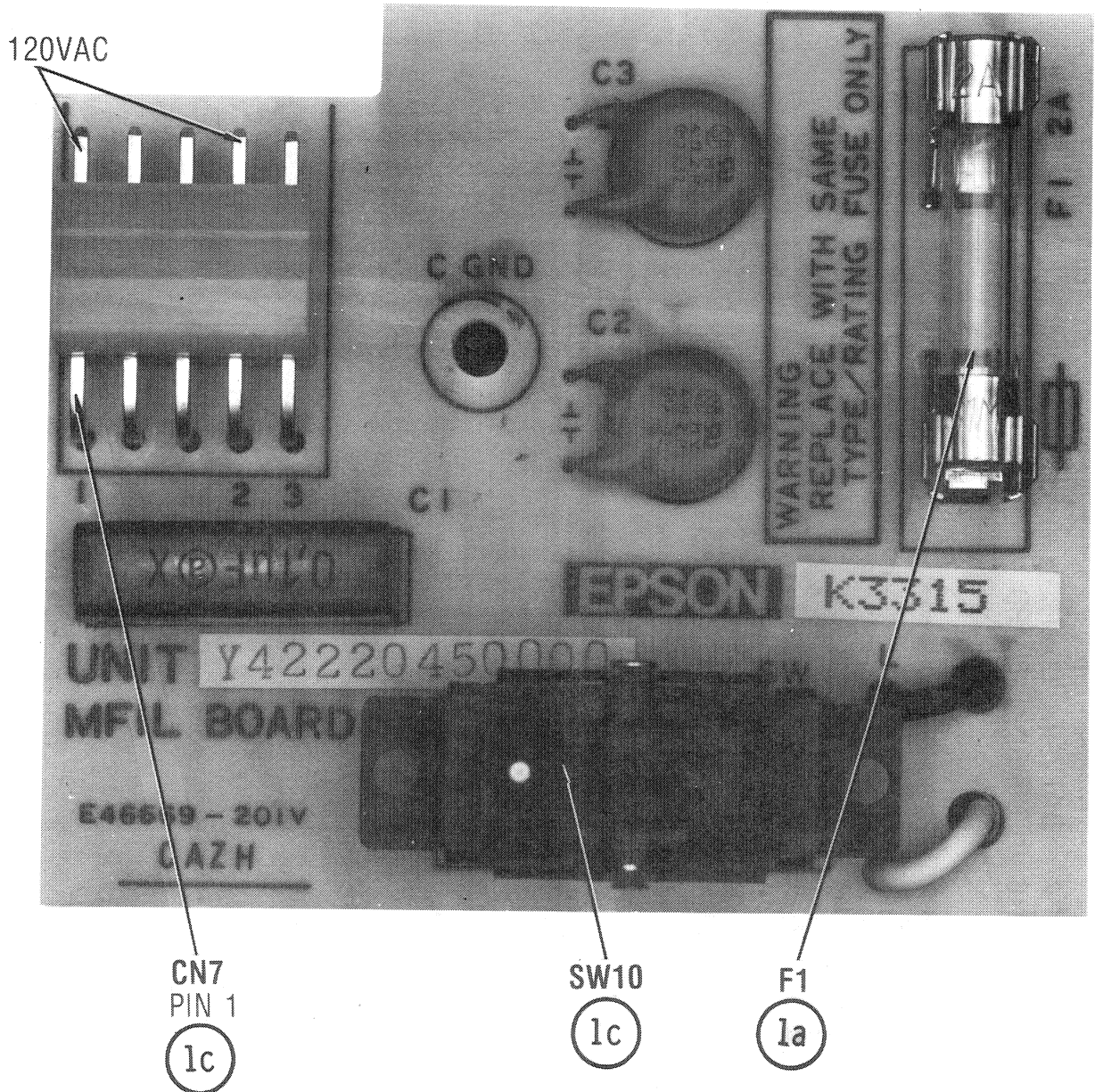


CHASSIS-TOP VIEW

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## PRELIMINARY SERVICE CHECKS (Continued)

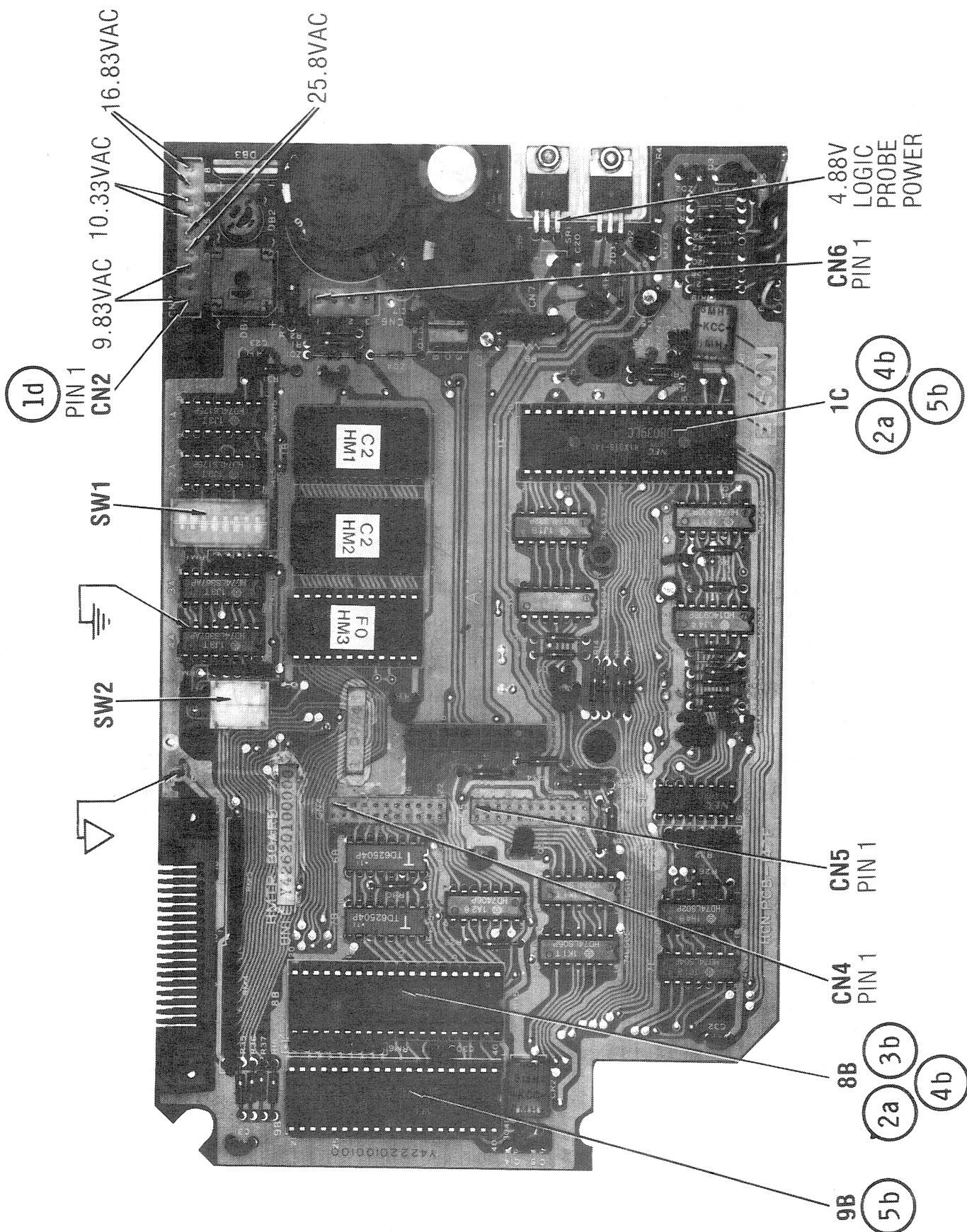


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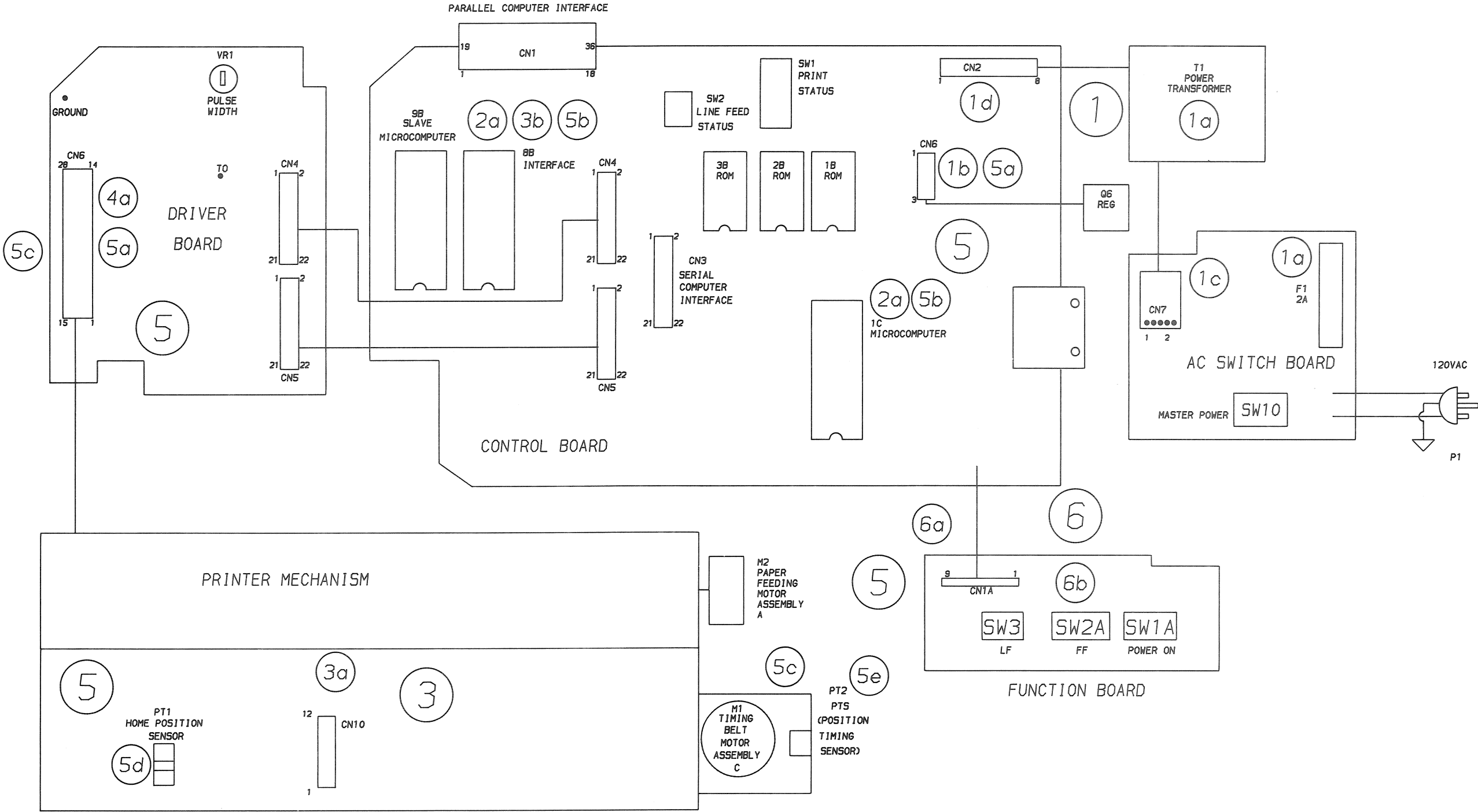


PRELIMINARY SERVICE CHECKS (Continued)



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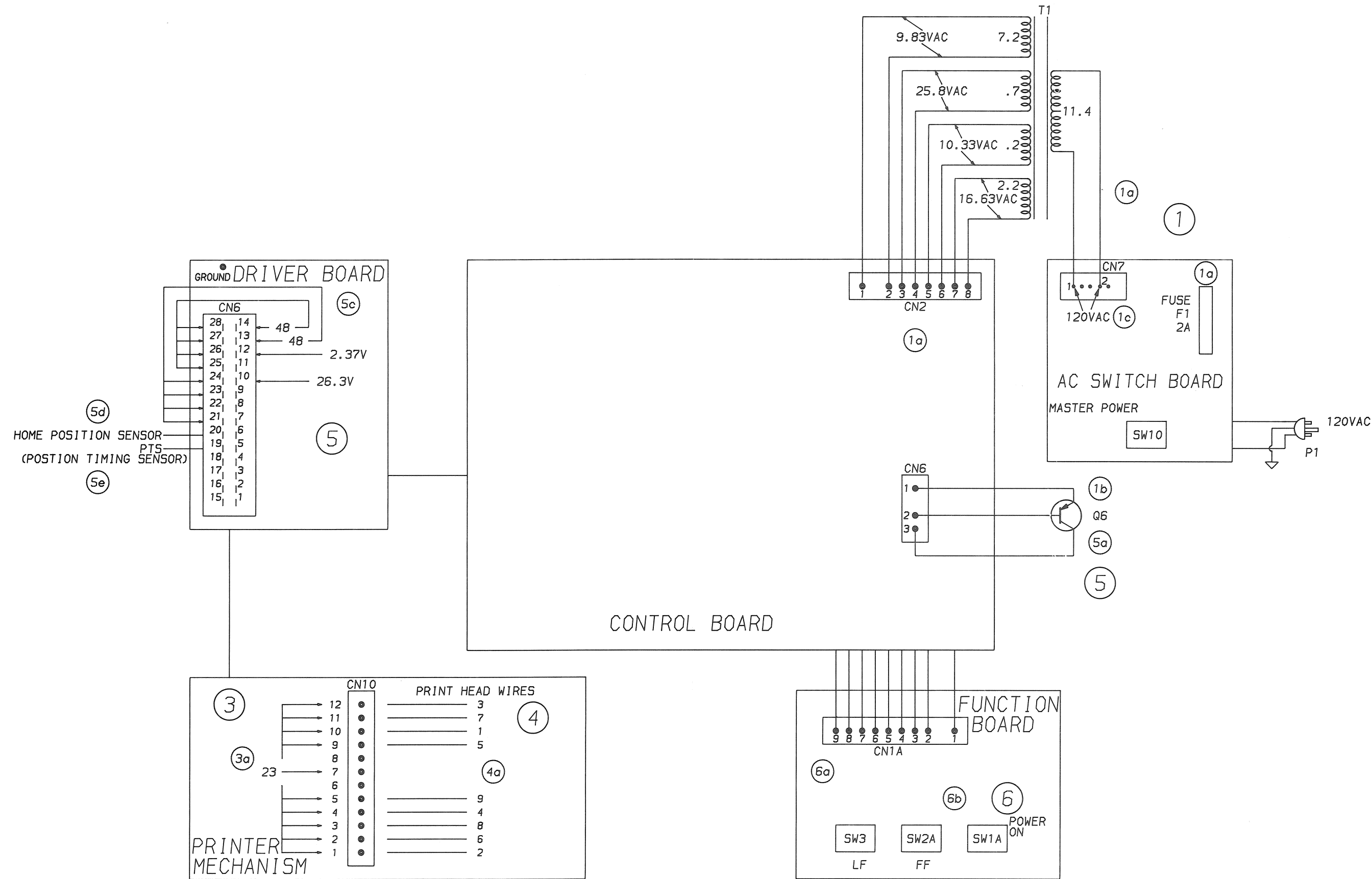


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PRELIMINARY SERVICE CHECKS (Continued)

PRELIMINARY SERVICE CHECKS (Continued)



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# PRELIMINARY SERVICE CHECKS (Continued)

## DISASSEMBLY INSTRUCTIONS

### CABINET REMOVAL

Remove five screws from cabinet top. Lift cabinet top from printer. Remove two screws holding Function Board to cabinet top and remove board from top.

### AC SWITCH BOARD REMOVAL

Unplug the power transformer from the AC Switch Board and remove one Phillips screw holding the board and one Phillips screw holding the ground lead of the power cord. Remove the AC Switch Board.

### DRIVER BOARD REMOVAL

Unplug the printer mechanism cable and remove two Phillips screws holding the Driver Board. Lift up and remove the Driver Board.

### CONTROL BOARD REMOVAL

Unplug the ground connector (FG), connector CN2 and connector CN6. Remove one Phillips screw near the center of the Control Board and two Phillips screws from the transistor heat sink on the side of the board. Push the three board retaining clips back, lift up and remove the Control Board.

### PRINTER MECHANISM REMOVAL

Unplug the printer mechanism cable from the Driver board. Remove two Phillips screws going thru rubber grommets at the front of the mechanism and remove one Phillips screw from the grounding strap next to the power transformer. Slide the mechanism forward and lift mechanism out of the cabinet bottom.

### PAPER END BOARD REMOVAL

Unhook PE Lever Spring (3-2) from Outer Paper Guide (6-1) and remove PE Board (3-4).

## MECHANICAL REMOVAL, REPLACEMENT AND ADJUSTMENTS

### RIBBON CARTRIDGE REPLACEMENT

Slide Carriage Assembly (5-5) to center. Move Scale Shaft (5-12) back and remove Ribbon Cartridge. Turn knob, on replacement Ribbon Cartridge, counterclockwise to tighten ribbon. Install the Ribbon Cartridge with the four tabs (two on each end) in the slots of Frame Assembly LB and RG (1-1 and 1-2). Press down on Ribbon Cartridge to secure in place. Slip the ribbon between Print Head (H1) and Ribbon Mask (5-17). Turn knob to retighten ribbon.

### PRINT HEAD REPLACEMENT

Slide Carriage Assembly (5-5) to the right. The Print Head cable has a pull tab. Use this tab to disconnect Print Head cable from connector on Terminal Board (8-1). Turn Head Lock Lever (5-6) clockwise. Lift and remove the Print Head (H1). Install replacement by reversing the removal procedure.

### TRACTOR FEED REMOVAL

While pressing forward on Sprocket Mounting Levers L and R (6-18 and 6-20), rock the assembly back and lift from the printer.

### PAPER THICKNESS ADJUSTMENT

Head Adjustment Lever (5-10) moves the Print Head toward and away from Platen Assembly F (5-1) to allow for paper thickness. Maximum paper thickness is 0.3mm (0.012 in). The seven settings provide normal adjustment. If adjustment of lever is required, because of replacement of parts, perform the following procedure.

Set the lever to the center position and loosen the nut securing Carriage Shaft B (5-9). Insert a screwdriver into hole in shaft. Hold screwdriver perpendicular to Base Frame Assembly F (1-3) and retighten nut. Movement of Head Adjustment Lever toward Maximum – position should move Print Head toward the Platen Assembly F. If Print Head moves away, loosen nut, rotate Carriage Shaft B 180 degrees and repeat adjustment.

### TIMING BELT REPLACEMENT

Remove printer mechanism from the cabinet, see Disassembly Instructions. Loosen Belt Tension Plate Assembly (4-6) and remove tension from Timing Belt D (4-1). Remove bottom left and top right screws securing Motor Heat Sink A (2-2). Remove belt from Belt Driving Pulley (4-2). The belt is fitted into the grooved plastic projection at the base of Carriage Assembly (5-5) and glued in place. A cutout is provided in Base Frame Assembly F (1-3) for access to separate the belt from the Carriage Assembly. Slide the Carriage Assembly over this cutout, located to the right of the Terminal Board (8-1).

The type of glue used does not produce a permanent bond. From the bottom, the grooved plastic projection can be forced apart to remove the belt or, if preferred, a drop of rubber cement solvent (or equivalent) can be used. CAUTION: Too much solvent can damage the belt. Tension on belt should not be adjusted until solvent has completely dried.

Install replacement by reversing the removal procedure. Before adjusting tension, apply a drop of glue and allow to dry to prevent belt from slipping out of the Carriage Assembly.

### TIMING BELT MOTOR REPLACEMENT

Loosen Belt Tension Plate Assembly (4-6) and remove tension from Timing Belt D (4-1). Remove four mounting screws from Timing Belt Motor Assembly C (M1). Remove the motor assembly and Motor Heat Sink A (2-2). Slide the motor assembly from the heat sink. Observe routing of lead wires and verify the same routing after performing replacement. Unsolder motor assembly lead wires from Terminal Board (8-1). Install replacement by reversing the removal procedure.

### PAPER FEEDING MOTOR REPLACEMENT

Remove two mounting screws from Paper Feeding Motor Assembly A (M2). Observe routing of lead wires and verify the same routing after performing replacement. Unsolder motor assembly lead wires from Terminal Board (8-1). Install replacement by reversing the removal procedure.

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# PRELIMINARY SERVICE CHECKS (Continued)

## TEST EQUIPMENT AND TOOLS

### TEST EQUIPMENT

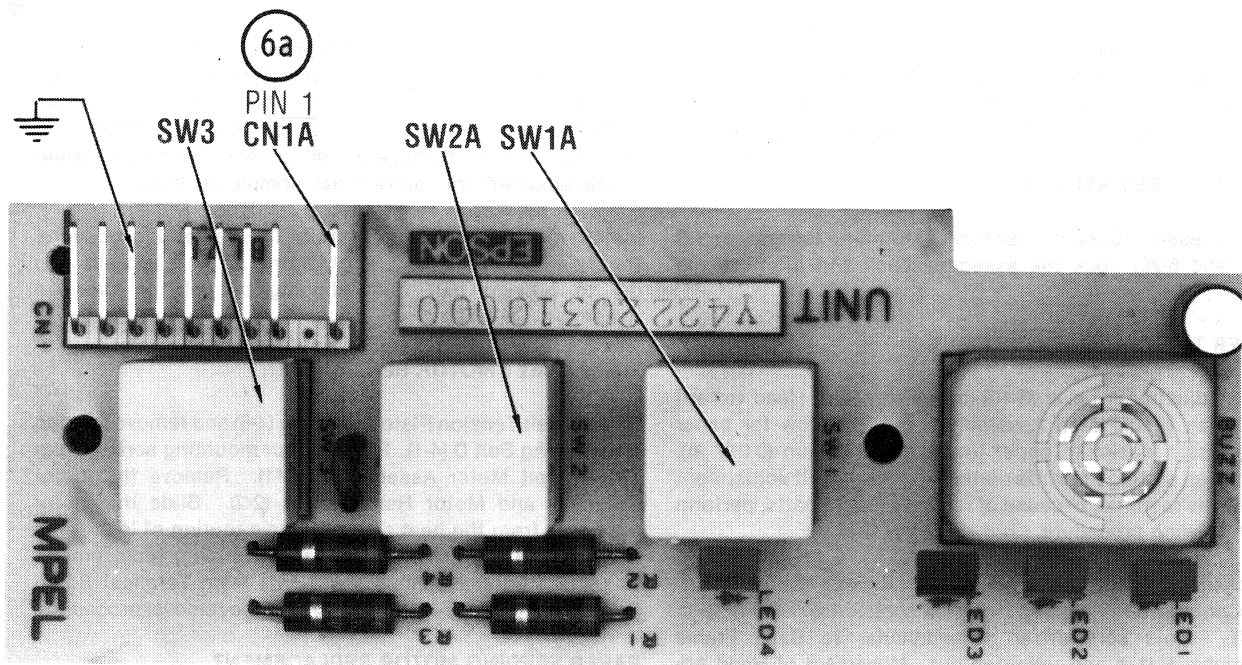
Digital Volt/Ohm Meter  
Logic Probe  
Transistor Tester

### TOOLS

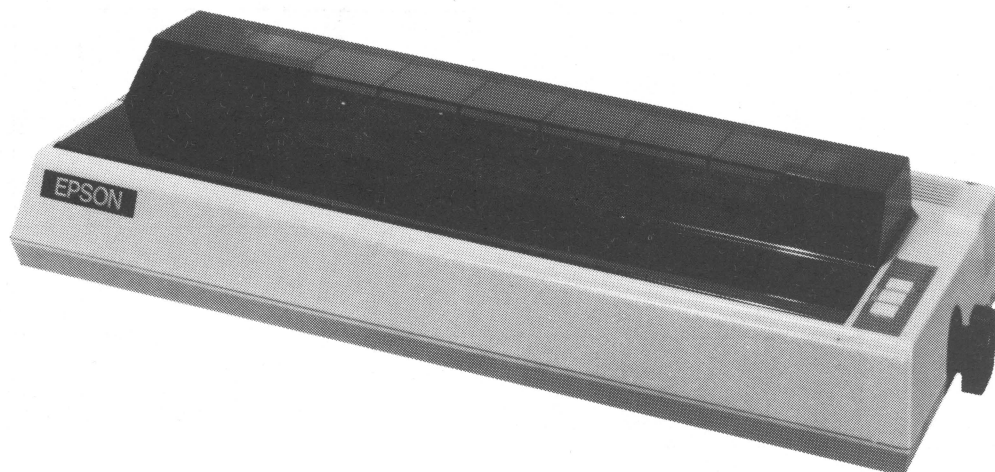
Phillips Screwdriver  
Needlenose Pliers  
Solvent for Belt  
9/32" Socket  
Small Screwdriver

## PARTS LIST AND DESCRIPTION

ITEM NO.	PART NO.	DESCRIPTION
F1	X502060020	Fuse (2A @ 250V)
H1	F401500000	Print Head
M1	F303027000	Timing Belt Motor Assembly C
M2	F303031000	Paper Feeding Motor Assembly A
Q6	Y422306000	Regulator Transistor (2SA1075)
T1	Y422501100	Power Transformer
1C	X400080390	Microcomputer IC
8B	X400081550	Interface IC
9B	Y422800203	Slave Microcomputer IC
	Y422204500	AC Switch Board (MFIL)
	Y426202000	Control Board (HMTP)
	Y422202000	Driver Board (MDRI)
	Y422203000	Function Board (MPEL)
	Y426590000	Printer Mechanism (Model-3360)



### FUNCTION BOARD



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## PRELIMINARY SERVICE CHECKS

ENCLOSED

## SAFETY PRECAUTIONS

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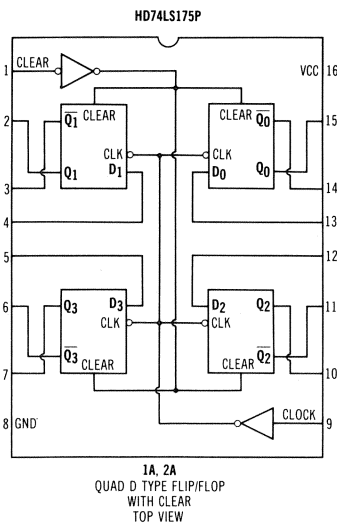
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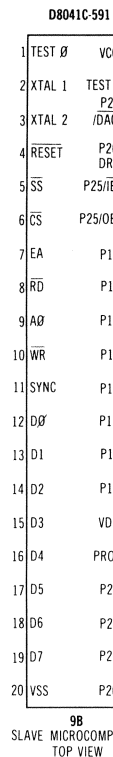
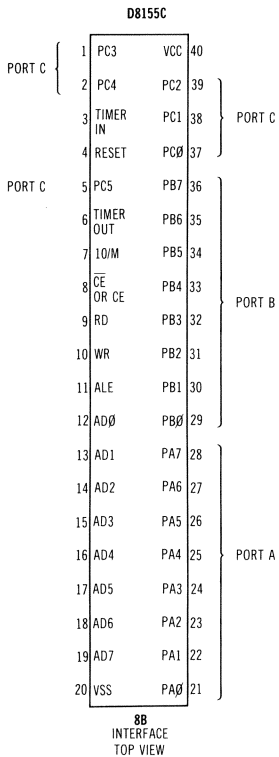
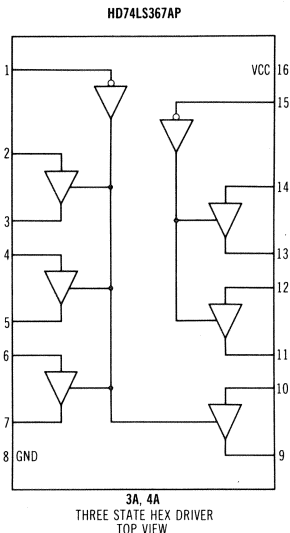


## FUNCTION, CONTROL & DRIVER BOARDS

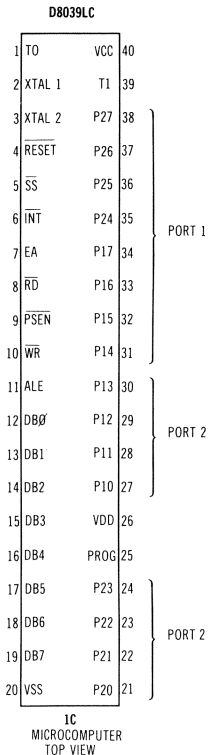
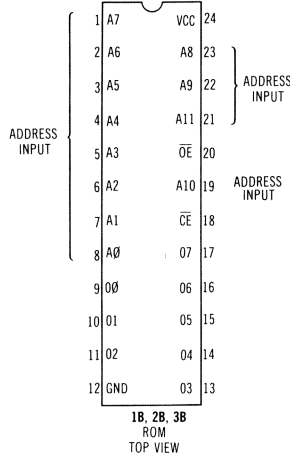
IC PINOUTS, TERMINAL GUIDES & SCHEMATIC NOTES



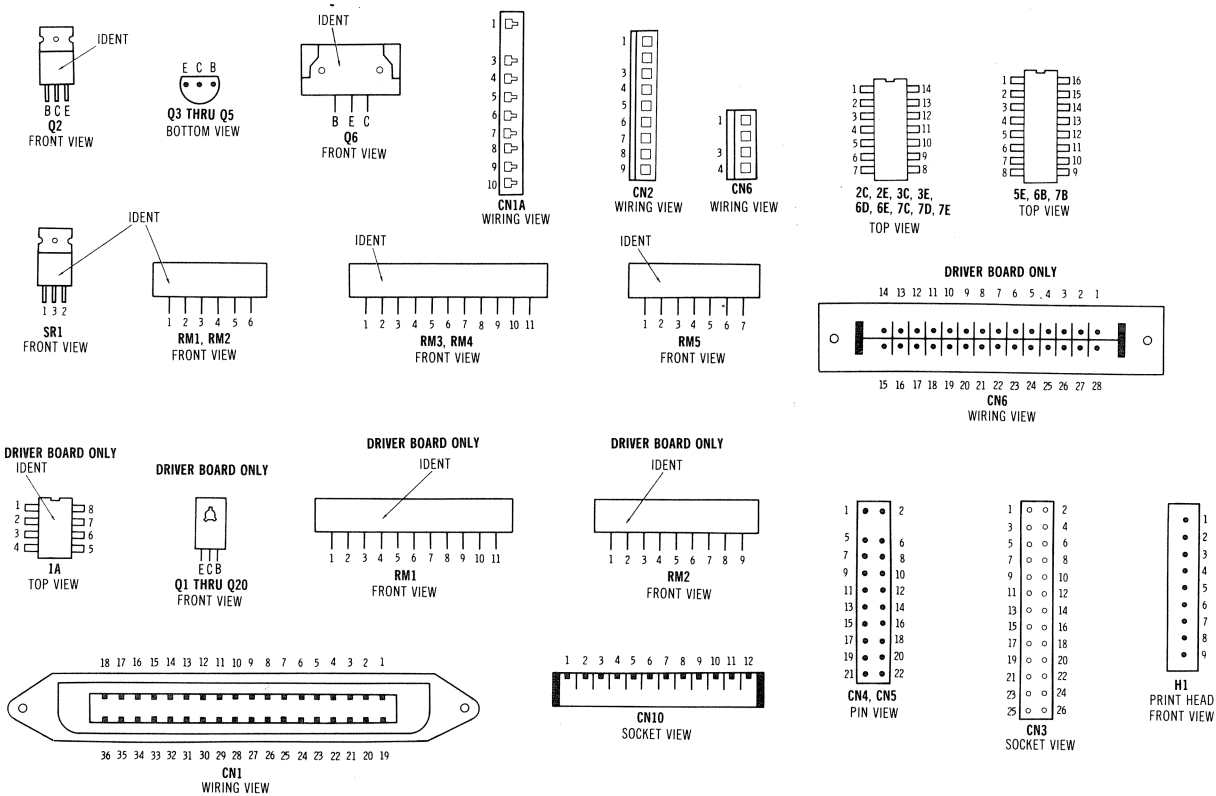
PINOUTS

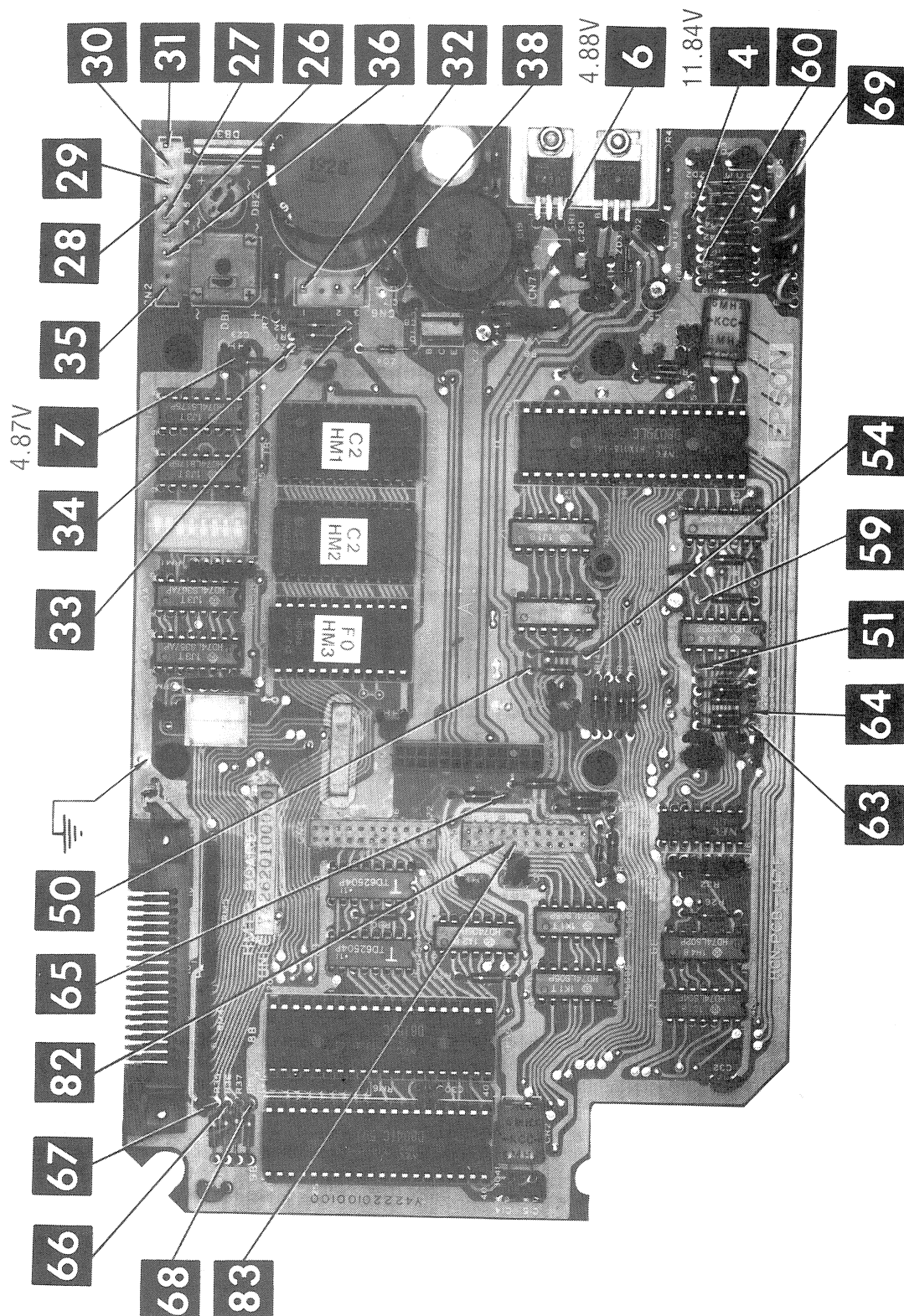


1B HN462716G-HM1-C2  
2B HN462716G-HM2-C2  
3B MB8516-HM3-F0



TERMINAL GUIDES



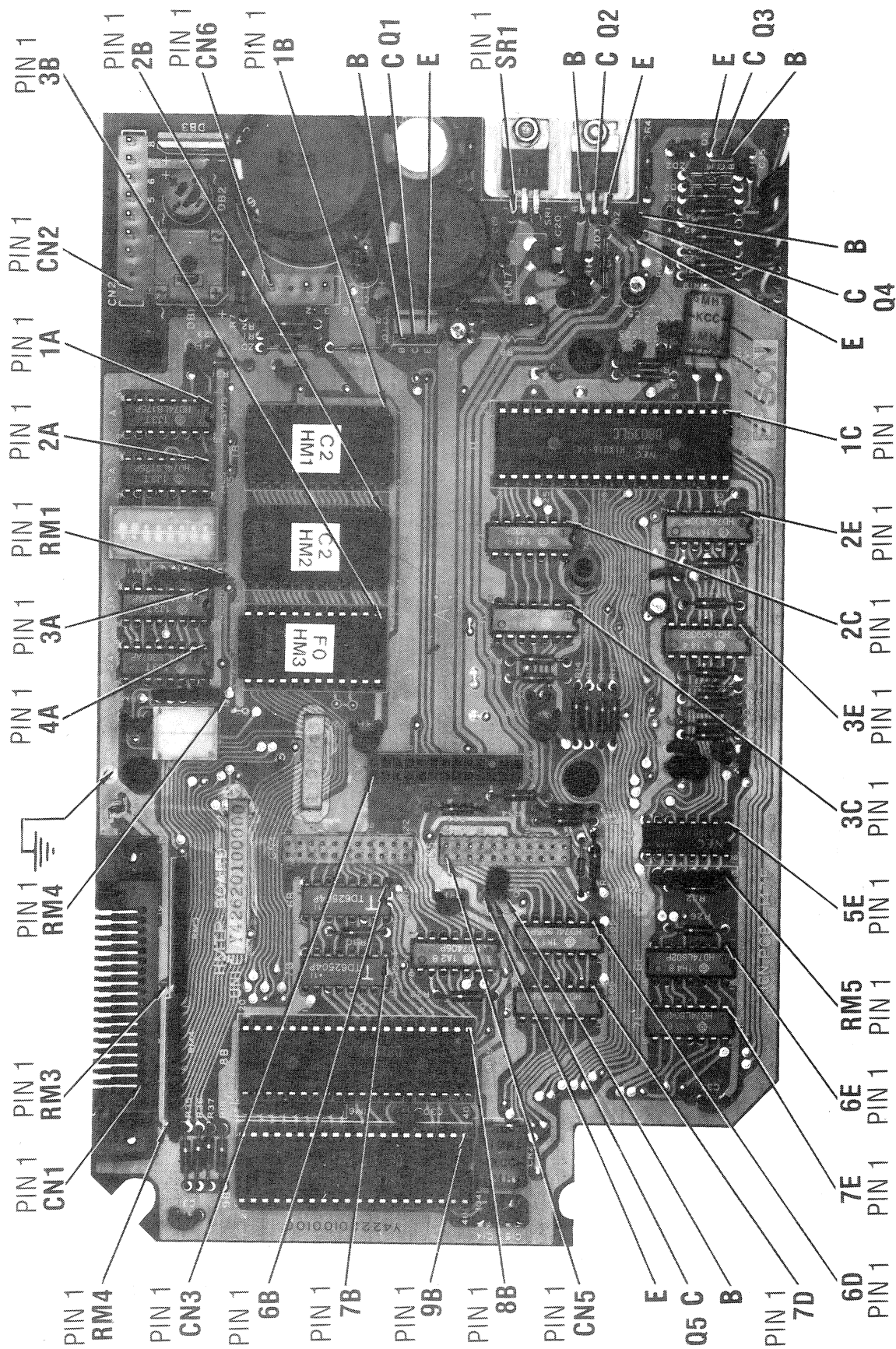


CONTROL BOARD

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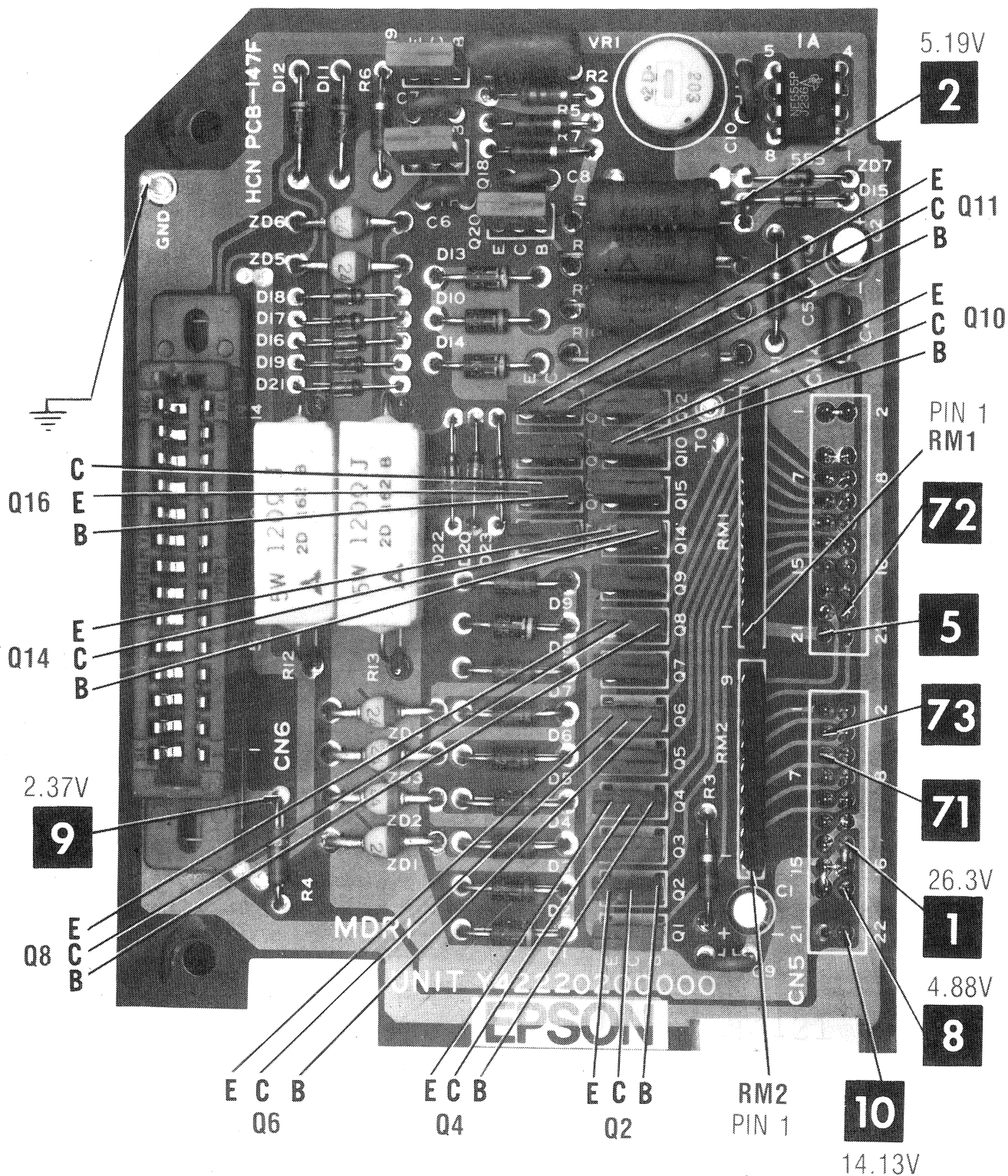


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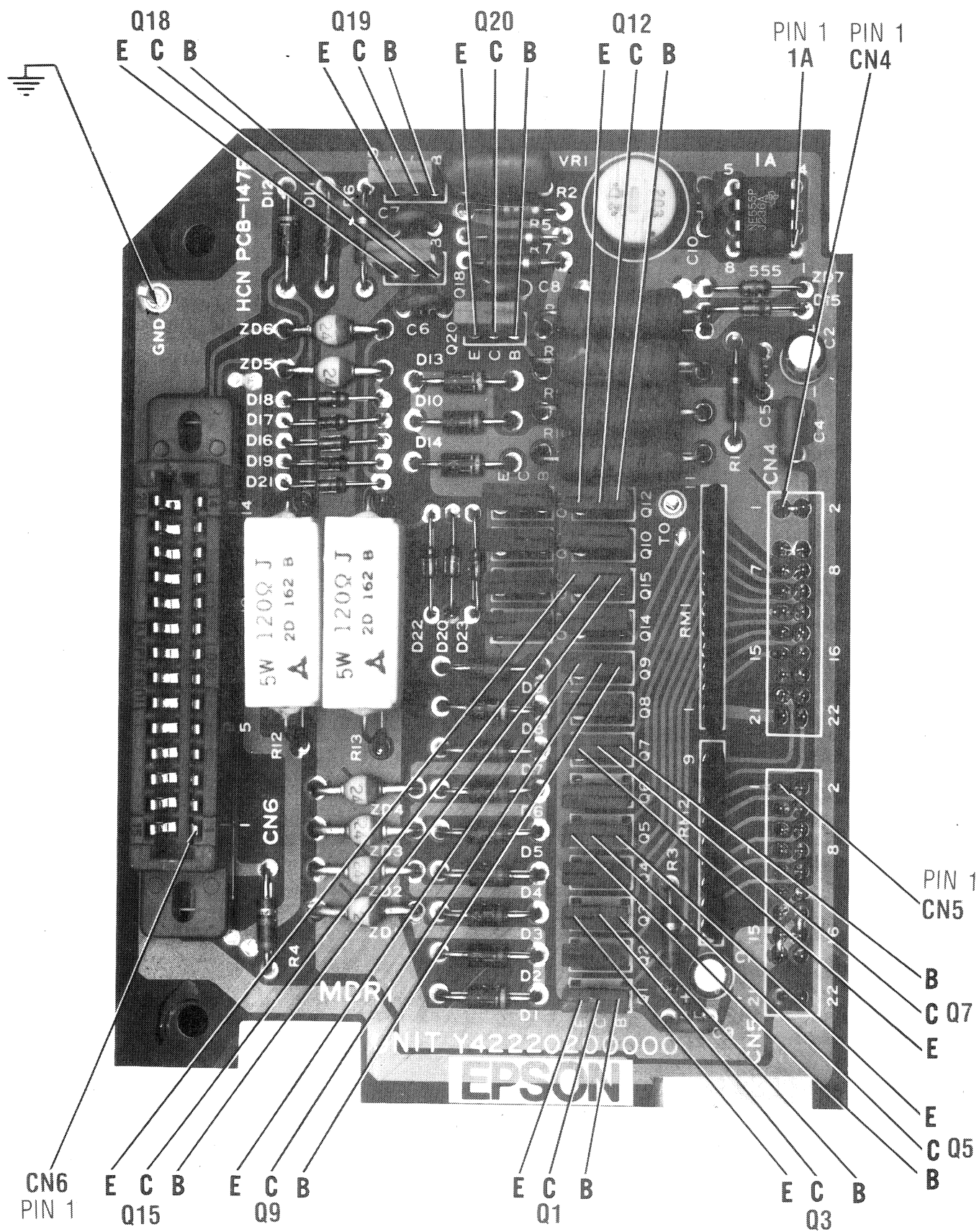


## CONTROL BOARD





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## DRIVER BOARD



# DISASSEMBLY INSTRUCTIONS

## CABINET REMOVAL

Remove five screws from cabinet top. Lift cabinet top from printer. Remove two screws holding Function Board to cabinet top and remove board from top.

## AC SWITCH BOARD REMOVAL

Unplug the power transformer from the AC Switch Board and remove one Phillips screw holding the board and one Phillips screw holding the ground lead of the power cord. Remove the AC Switch Board.

## DRIVER BOARD REMOVAL

Unplug the printer mechanism cable and remove two Phillips screws holding the Driver Board. Lift up and remove the Driver Board.

## CONTROL BOARD REMOVAL

Unplug the ground connector (FG), connector CN2 and connector CN6. Remove one Phillips screw near the center of the Control Board and two Phillips screws from the transistor heat sink on the side of the board. Push the three board retaining clips back, lift up and remove the Control Board.

## PRINTER MECHANISM REMOVAL

Unplug the printer mechanism cable from the Driver board. Remove two Phillips screws going thru rubber grommets at the front of the mechanism and remove one Phillips screw from the grounding strap next to the power transformer. Slide the mechanism forward and lift mechanism out of the cabinet bottom.

## PAPER END BOARD REMOVAL

Unhook PE Lever Spring (3-2) from Outer Paper Guide (6-1) and remove PE Board (3-4).

## MECHANICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1-1	F304002000	Frame Assembly LB	6-7	F303011040	Paper Holding Cover Spring (2 used)
1-2	F310002000	Frame Assembly RG	6-8	F303011050	Sprocket Lock Lever (2 used)
1-3	F310052000	Base Frame Assembly F	6-9	F310102010	Sprocket Shaft
2-2	F303026010	Motor Heat Sink A	6-10	F304104020	Sprocket Gear
3-1	F310011000	PE Level Assembly A	6-11	F304004020	Plane Bearing (For Sprocket) (2 used)
3-2	F303007020	PE Lever Spring	6-12	F310101010	Sprocket Guide Shaft
3-3	F310009020	PE Lever Shaft	6-13	F310101030	Sprocket Paper Guide (2 used)
4-1	F310057020	Timing Belt D	6-14	F303001080	Sprocket Transmission Gear
4-2	F303017000	Belt Driving Pulley	6-15	F310051010	Paper Guide Plate
4-3	B210151490	Ball Bearing (3 used)	6-16	F303037010	Sprocket Frame R
4-4	F303018010	Belt Driven Pulley	6-17	F303037020	Paper Holding Cover R
4-5	F303018020	Belt Driven Pulley Flange	6-18	F304101030	Sprocket Mounting Lever L
4-6	F303019000	Belt Tension Plate Assembly	6-19	F304101060	Sprocket Mounting Lever Spring (2 used)
5-1	F310004000	Platen Assembly F	6-20	F304101040	Sprocket Mounting Lever R
5-2	F304004010	Platen Gear	6-21	F310103000	Sprocket Mounting Plate Assembly C
5-3	F304004020	Plane Bearing (For Platen) (2 used)	6-22	F304103000	Sprocket Mounting Plate Assembly B
5-4	F310003010	Frame Sub Plate (2 used)	6-23	F304101010	Sprocket Reduction Gear
5-5	F303006000	Carriage Assembly	6-24	F310101020	Paper Position Adjusting Plate
5-6	F303005010	Head Lock Lever	6-25	F306009010	Sprocket Mounting Shaft
5-7	F303005020	Head Lock Lever Spring	6-26	F310001040	Release Lever Shaft
5-8	F310001010	Carriage Shaft A	6-27	F304001030	Release Lever L
5-9	F310001020	Carriage Shaft B	6-28	F304001040	Release Lever R
5-10	F303001030	Head Adjust Lever	6-29	F310005010	Paper Feeding Shaft
5-11	F310007010	Paper Holding Lever	6-30	F310006010	Paper Feeding Roller (2 used)
5-12	F310008010	Scale Shaft	6-31	F304001020	Paper Feeding Spring (2 used)
5-13	F304008020	Paper Holding Roller A (2 used)	6-32	F310001030	Platen Cover
5-14	F304008030	Paper Holding Spring (2 used)	6-33	F304001070	Roll-in Protector
5-15	F303001060	Scale Spring L	6-34	F310006020	O-ring (4 used)
5-16	F303001070	Scale Spring R	6-35	F307051020	Paper Guide Spring (6 used)
5-17	F303001092	Ribbon Mask	7-1	F303020000	Planetary Lever Assembly
5-18	F303001100	Head Sitting Plate	7-2	F303020020	Planetary Pinion (3 used)
5-20	F310057040	Cartridge Sitting Plate L	7-3	F303014020	Ribbon Driving Gear
5-21	F310057030	Cartridge Sitting Plate R	8-4	F310054010	3360 Cable
6-1	F310009010	Outer Paper Guide	8-5	A279950001	Wire Band (3 used)
6-2	F310010010	Inner Paper Guide			
6-3	F303036010	Sprocket Frame L			
6-4	F303011020	Sprocket Wheel (2 used)			
6-5	F303036020	Paper Holding Cover L			
6-6	F303011060	G-pin (2 used)			

For replacement of parts not listed, order from manufacturer, state description and location of part.

CP2 EPSON MODEL MX-100



# GENERAL OPERATING INSTRUCTIONS

## PRINT STATUS (SW1) AND LINE FEED STATUS (SW2)

SW1	On	Off
1	Compressed	Normal
2	Not Used	
3	Paper Out Sensor On	Paper Out Sensor Off
4	Italic	Normal
5	Emphasized	Normal
6	Buzzer On	Buzzer Off
7	Slashed Zero	Regular Zero
8	Select Fixed	Select Not Fixed

SW2	On	Off
1	Not Used	
2	Not Used	
3	Auto Line Feed with Carriage Return	Line Feed from Host
4	One Inch Skip Over Perf	Normal (No Skip)

## PRINTER SELF-TEST

To use the built-in self-test function, put paper in the printer and hold down the LF (Line Feed) button while turning On the printer.

## ON LINE, FF AND LF BUTTONS

Printer is On Line (Ready to receive data from the computer) when all three green LED's are On. The printer is Off Line when only the top green LED is On. Pressing the On Line button once puts the printer Off Line and pressing it again puts the printer back On Line. The printer must be Off Line for the FF (Form Feed) and LF (Line Feed) buttons to function.

## ADJUSTMENTS

### HEAD DRIVER PULSE WIDTH ADJUSTMENT

Connect the input of a scope to Test Point TO on the Driver Board and set the horizontal sweep to .1ms trigger to positive edge. Use the printer self-test mode (Hold LF button down while turning On the printer) to make the printer print. While the printer is printing, adjust the Pulse Width Control (VR1) for a pulse width of .32ms. See Figure 1.

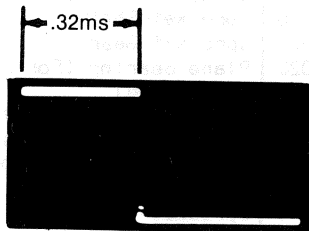


Figure 1

Connect Channel B input of the scope to pin 28 of IC 1C and set the trigger to trigger on Channel B, negative edge, normal mode. Check for a time difference of .8ms or more from the trailing edge of the PRAV signal on pin 28 to the leading edge of the first pulse of the TIN signal on pin 39. If the time difference is less than .8ms, readjust the PTS Sensor Board slightly for a difference of .8ms or more. See Figure 3.

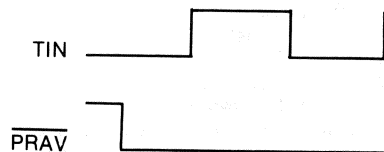


Figure 3

### PTS SENSOR BOARD ADJUSTMENT

Connect Channel A of a dual trace scope to pin 39 of Microcomputer IC (1C) and set the horizontal sweep to .5ms, trigger to positive edge. Use the printer self-test mode (Hold LF button down while turning On the printer) to make the printer print. Loosen the screw holding the PTS (Position Timing Signal) Sensor Board to the right side of the carriage return motor. Use a screwdriver in the slot provided to adjust the PTS Sensor Board for a pulse cycle of 2.08ms while the printer is printing. See Figure 2.

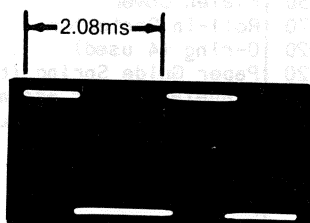


Figure 2

### HOME POSITION SENSOR ADJUSTMENT

Connect Channel A input of a dual trace scope to pin 11 of IC 3E and Channel B input to pin 39 of IC (1C). Set the horizontal sweep to .5ms and set the trigger for Channel A, positive edge, normal mode. Use the printer self-test mode (Hold LF button down while turning On the printer) to make the printer print. Loosen the screw holding the Home Sensor Board and use a screwdriver in the slot provided to adjust the Home Sensor Board for a phase relationship of .9ms to 1.2ms between the reset signal on pin 11 of IC 3E and the TIN signal on pin 39 of IC 1C. See Figure 4.

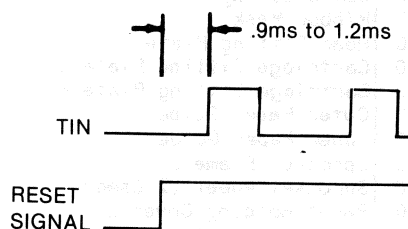


Figure 4

# MECHANICAL REMOVAL, REPLACEMENT AND ADJUSTMENTS

## RIBBON CARTRIDGE REPLACEMENT

Slide Carriage Assembly (5-5) to center. Move Scale Shaft (5-12) back and remove Ribbon Cartridge. Turn knob, on replacement Ribbon Cartridge, counterclockwise to tighten ribbon. Install the Ribbon Cartridge with the four tabs (two on each end) in the slots of Frame Assembly LB and RG (1-1 and 1-2). Press down on Ribbon Cartridge to secure in place. Slip the ribbon between Print Head (H1) and Ribbon Mask (5-17). Turn knob to retighten ribbon.

## PRINT HEAD REPLACEMENT

Slide Carriage Assembly (5-5) to the right. The Print Head cable has a pull tab. Use this tab to disconnect Print Head cable from connector on Terminal Board (8-1). Turn Head Lock Lever (5-6) clockwise. Lift and remove the Print Head (H1). Install replacement by reversing the removal procedure.

## TRACTOR FEED REMOVAL

While pressing forward on Sprocket Mounting Levers L and R (6-18 and 6-20), rock the assembly back and lift from the printer.

## PAPER THICKNESS ADJUSTMENT

Head Adjustment Lever (5-10) moves the Print Head toward and away from Platen Assembly F (5-1) to allow for paper thickness. Maximum paper thickness is 0.3mm (0.012 in). The seven settings provide normal adjustment. If adjustment of lever is required, because of replacement of parts, perform the following procedure.

Set the lever to the center position and loosen the nut securing Carriage Shaft B (5-9). Insert a screwdriver into hole in shaft. Hold screwdriver perpendicular to Base Frame Assembly F (1-3) and retighten nut. Movement of Head Adjustment Lever toward Maximum – position should move Print Head toward the Platen Assembly F. If Print Head moves away, loosen nut, rotate Carriage Shaft B 180 degrees and repeat adjustment.

## TIMING BELT REPLACEMENT

Remove printer mechanism from the cabinet, see Disassembly Instructions. Loosen Belt Tension Plate Assembly (4-6) and remove tension from Timing Belt D (4-1). Remove bottom left and top right screws securing Motor Heat Sink A (2-2). Remove belt from Belt Driving Pulley (4-2). The belt is fitted into the grooved plastic projection at the base of Carriage Assembly (5-5) and glued in place. A cutout is provided in Base Frame Assembly F (1-3) for access to separate the belt from the Carriage Assembly. Slide the Carriage Assembly over this cutout, located to the right of the Terminal Board (8-1).

The type of glue used does not produce a permanent bond. From the bottom, the grooved plastic projection can be forced apart to remove the belt or, if preferred, a drop of rubber cement solvent (or equivalent) can be used. CAUTION: Too much solvent can damage the belt. Tension on belt should not be adjusted until solvent has completely dried.

Install replacement by reversing the removal procedure. Before adjusting tension, apply a drop of glue and allow to dry to prevent belt from slipping out of the Carriage Assembly.

## TIMING BELT MOTOR REPLACEMENT

Loosen Belt Tension Plate Assembly (4-6) and remove tension from Timing Belt D (4-1). Remove four mounting screws from Timing Belt Motor Assembly C (M1). Remove the motor assembly and Motor Heat Sink A (2-2). Slide the motor assembly from the heat sink. Observe routing of lead wires and verify the same routing after performing replacement. Unsolder motor assembly lead wires from Terminal Board (8-1). Install replacement by reversing the removal procedure.

## PAPER FEEDING MOTOR REPLACEMENT

Remove two mounting screws from Paper Feeding Motor Assembly A (M2). Observe routing of lead wires and verify the same routing after performing replacement. Unsolder motor assembly lead wires from Terminal Board (8-1). Install replacement by reversing the removal procedure.

# TROUBLESHOOTING

## PRINTER WILL NOT RECEIVE DATA

Printer will not receive data from the computer. Set the computer up to send information to the printer and check for STB (Strobe) signal pulses at pin 8 of IC 2E.

If the STB pulses are missing, check for pulses on pin 12 of IC 3C. If the pulses are present on pin 12 of IC 3C, check Capacitor C11 and check IC 2E by substitution. If the pulses are missing on pin 12 of IC 3C, check Capacitor C9 and check IC 3C by substitution.

If the STB pulses check good, check for pulses on the BUSY line (pin 4 of Plug CN3) and the ACK line (pin 6 of Plug CN3). If either pulses are missing, check for pulses at pin 2 of IC 6E. If pulses are missing at pin 2 of IC 6E, check Interface IC (8B) and IC 1C by substitution. If pulses are present at pin 2 of IC 6E, check IC's 6E and 7C by substitution.

If the STB, BUSY and ACK signals check good, check IC's 8B and 1C by substitution.

## TROUBLESHOOTING (Continued)

### POWER SUPPLY

Printer will not turn On. Check the AC Line Fuse (F1). If Fuse F1 is bad, check Capacitors C1A, C2A and C3A on the AC Switch Board for possible shorts, check Transformer T1 for shorted windings, and check the inputs and outputs of the Bridge Rectifier Diodes (DB1, DB2 and DB3) for possible shorts to ground.

If Fuse F1 is good, apply AC power and check for 120VAC from pin 1 to pin 2 of Plug CN7. If 120VAC is missing, check the Master Power Switch (SW10). If the 120VAC is present, check the AC voltages on the four secondary windings of Transformer T1 at Plug CN2. If any of the AC voltages are missing, check Transformer T1 windings.

Check the DC voltages at the outputs of Diodes DB1, DB2 and DB3. If any of the voltages are missing, check the associated Diode.

Check for 26.3V at pin 3 of Plug CN6. If 26.3V is missing, check the voltages and components associated with Driver Transistor (Q1) and Regulator Transistor (Q6), and check Zener Diode ZD4.

Check for 11.84V at the collector of Regulator Transistor (Q4). If 11.84V is missing, check the voltages and components associated with Driver Transistor (Q3) and Transistor Q4, check Zener Diodes ZD1 and ZD2, and Diode D2.

Check for 4.88V at pin 2 of Regulator SR1. If 4.88V is missing, check Regulator SR1 and associated components.

Check for 14.13V at the emitter of Regulator Transistor (Q2). If 14.13V is missing, check Transistor Q2, Zener Diode ZD3 and Capacitor C21.

### MICROCOMPUTER CHIP OPERATION

Check for 4.88V on pin 40 of Microcomputer IC (1C). If 4.88V is missing, refer to the "Power Supply" section of this Troubleshooting guide.

Verify that the clock oscillators are functioning by checking the waveforms on pin 2 of IC 1C and Slave Microcomputer IC (9B) and check for a frequency of 6.00MHz on both oscillators. If either oscillator is not functioning, check the components connected to pins 2 and 3 of the IC with the defective oscillator and check the IC by substitution.

If the clock oscillators are good, check the waveforms on pins 9 and 11 of IC 1C and pin 11 of IC 9B. The pulses should measure  $2.5\mu\text{s}$  from the leading edge of one pulse to the leading edge of the next pulse. If any of the waveforms are missing, check the IC by substitution. If the waveforms check good, check the logic probe readings on the remaining pins of IC's 1C and 9B.

### PRINT HEAD

Print Head is moving back and forth but not printing. Check for 26.3V on the emitters of Driver Transistors (Q1 thru Q9) on the Driver Board. If 26.3V is missing, refer to the "Power Supply" section of this Troubleshooting guide. If 26.3V is good, check for pulses at pin 37 of Microcomputer IC (1C) while printing.

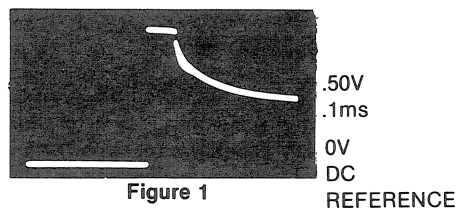
If the pulses at pin 37 of IC 1C are missing, check IC 1C by substitution. If the pulses are present, check for pulses at pin 3 of Timer IC (1A) on the Driver Board while printing.

If the pulses at pin 3 of IC 1A are missing, check the voltages and components associated with pins 1 thru 8 of IC 1A and check the adjustment of the Pulse Width Control (VR1). If pulses are present, check for pulses at Test Point TO and check for a pulse width of about .32ms.

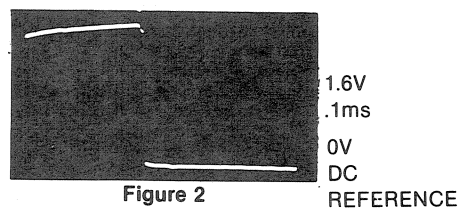
If the pulses at Test Point TO are missing, check Switching Transistor (Q5) and check pins 1 and 16 of IC 6B. If the pulse width is not correct, check the adjustment of the Pulse Width Control (VR1). If the pulses at Test Point TO are good, check for pulses at pins 2 and 29 thru 36 of Interface IC (8B) while printing.

If the pulses at pins 2 and 29 thru 36 of IC 8B are missing, check IC 8B by substitution. If the pulses are present, check IC 7B and pins 6, 7, 10 and 11 of IC 6B.

If one pin in the Print Head is not functioning, check for the waveform shown in Figure 1 at the collector of the Transistor driving the defective pin while printing. If the collector waveform is good, check the pin on the Print Head for possible damage.

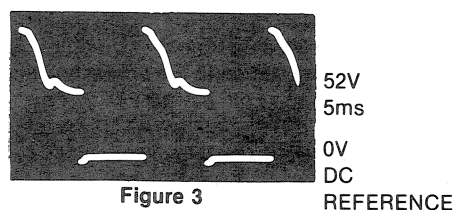


If the collector waveform is missing, check for the waveform shown in Figure 2 at the base of the Driver Transistor while printing. If the base waveform is good, check the Driver Transistor and check for an open solenoid coil in the Print Head. If the base waveform is missing, check the buffer driving the Driver Transistor and check IC 8B by substitution.



### PAPER FEED MOTOR ASSEMBLY

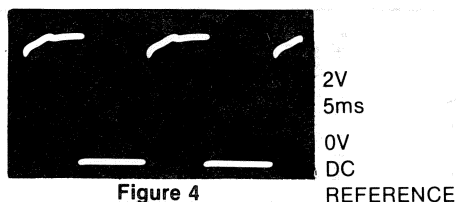
Printer will not advance the paper. Put the printer in Off Line mode (press the On Line button), press the FF (Form Feed) button and check for the waveform shown in Figure 3 at the collectors of Line Feed Driver (Q14 thru Q17).



## TROUBLESHOOTING (Continued)

### PAPER FEED MOTOR ASSEMBLY (Continued)

If the collector waveform is missing at one of the Transistors, check for the waveform shown in Figure 4 at the base of the Transistor. If the base waveform is present, check the Transistor, and associated components, that has the missing collector waveform. If the Transistor and associated components check good, check the Paper Feed Motor Assembly (M2). If the waveform on the base of the Transistor is missing, check the buffers driving the Transistor and check Slave Microcomputer IC (9B) by substitution.



If the collector waveform does not appear on any of Transistors Q14 thru Q17, check the voltage on the collector of Line Feed Driver Transistor (Q20) after pressing the FF button. The voltage should go up to 25.5V. If 25.5V is missing, check the emitter and base voltage of Transistor Q20. If the emitter voltage is missing, refer to the "Power Supply" section of this Troubleshooting guide. If the base voltage does not drop to about 24.8V after pressing the FF button, check Transistor Q20 and associated components. Also, check the logic probe readings on pins 6 and 11 of IC 5E and pins 1 and 2 of IC 6D.

If the probe readings are not correct, check IC's 5E, 6D and 9B by substitution. If all readings are correct, check the Paper Feed Motor Assembly.

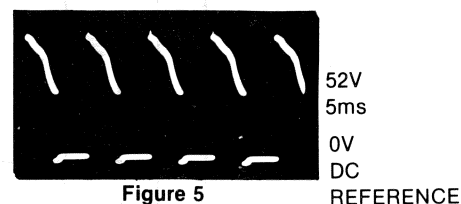
### TIMING BELT MOTOR ASSEMBLY

Timing Belt Motor Assembly (M1) does not move the Print Head back and forth. Check the operation of the Home Position Sensor (PT1) and the PTS (Position Timing Sensor) Sensor (PT2).

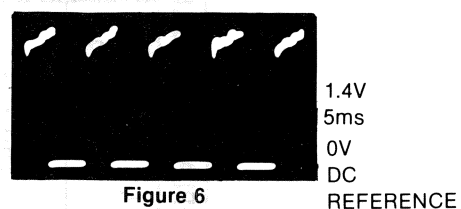
Check the Home Position Sensor by monitoring the logic probe reading at pin 20 of Plug CN6 while sliding a piece of paper in and out of the slot in the Home Position Sensor. The probe should read low with the paper out of the slot and high with the paper in the slot. If the Home Position Sensor checks good, check the logic probe reading at pin 11 of IC 3E while sliding the paper in and out of the Home Position Sensor. The probe should read high with the paper out of the slot and low with the paper in the slot. If the probe reading is not correct, check the components connected to pins 12 and 13 of IC 3E and check IC 3E and Slave Microcomputer (9B) by substitution.

Check the PTS Sensor by checking for pulses with a logic probe at pin 19 of Plug CN6 while manually moving the Print Head. If the PTS Sensor checks good, check for pulses at pin 10 of IC 3E while manually moving the Print Head. If the pulses are missing, check the components connected to pins 8 and 9 of IC 3E and check IC's 3E and 9B and Interface IC (8B) by substitution.

If the sensor circuits check good, check for the waveform shown in Figure 5 on the collectors of Carriage Driver Transistors (Q10 thru Q13) while the printer is printing.



If the collector waveform is missing on one of the Transistors, check for the waveform shown in Figure 6 at the base of the Transistor. If the base waveform is present, check the Transistor, and associated components, that has the missing collector waveform. If the transistor and associated components check good, check the Timing Belt Motor Assembly. If the base waveform is missing, check the buffers driving the Transistor and check IC 9B by substitution.



If the collector waveform does not appear at any of the Transistors Q10 thru Q13, check for 25.4V on the collector of 80 Column Driver Transistor (Q18) and 14.00V on the collector of 132 Column Driver Transistor (Q19) while printing. If the voltages check good, check the Carriage Return Motor.

If 25.4V is missing from the collector of Transistor Q18, check for 26.3V on the emitter. If 26.3V is missing, refer to the "Power Supply" section of this Troubleshooting guide. NOTE: If the printer is printing in the compressed mode, the voltage on the collector of Transistor Q18 will stay at 0V. If the emitter voltage of Transistor Q18 checks good, check the logic probe readings on pins 8, 9 and 10 of IC 6E and pins 5 and 12 of IC 5E while printing. If the probe readings are good, check Transistor Q18 and associated components. If the probe readings are not correct, check IC's 5E, 6E and 9B by substitution.

If 14.00V is missing from the collector of Transistor Q19, check for 14.13V on the emitter of Transistor Q19. If 14.13V is missing, refer to the "Power Supply" section of this Troubleshooting guide. If 14.13V is present, check the logic probe readings on pins 3 and 4 of IC 6D and pins 7 and 10 of IC 5E while printing. If the probe readings are good, check Transistor Q19 and check the components associated with Transistor Q19. If the probe readings are not correct, check IC's 5E, 6D and 9B by substitution.



## 4 PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

### SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						
			EGG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
D1,2 DB1	1S2075K	X320010070	ECG519	GE-514	1N4935	NTE519	SK3100/519	WEP925/519	103-131
	3D1.E		ECG5312		MDA801	NTE5312	SK3985/5312	WEP1065	
	3B4B1	X340400060	ECG5312		MDA801	NTE5312	SK3985/5312	WEP1065	
	1B1.1		ECG5304	GE-5304	MDA920A6	NTE5304	SK3106/5304	WEP1053	
DB2	1B4B1	X340040030	ECG5304	GE-5304	MDA920A6	NTE5304	SK3106/5304	WEP1053	212-Z9001
	1B4B41	X340400040	ECG166	GE-166	3N254	NTE166	SK9075/166	WEP1051/166	
PT1	B108J	F310056000(1)							121-987-03
	B230L	F304059000(2)							
Q1	2SD880GR		ECG152	GE-66A	TIP41A	NTE152	SK3440/291	WEP745/152	121-987-03
	2SD880	X303088080	ECG152	GE-66A	TIP41A	NTE152	SK3440/291	WEP745/152	
Q2	2SD864								121-972*
	2SD560	X303056001	ECG85	GE-212	MPSA18*	NTE85	SK3124A/289A	WEP736/123A*	
Q3	2SC945	X302094530	ECG290A	GE-82*	2N4403	NTE290A	SK9132	WEP911/290A	121-Z9003
	2SA1015Y		ECG290A	GE-82*	2N4403	NTE290A	SK9132	WEP911/290A	
Q4,5	2SA1015	X300101500	ECG290A	GE-82*					121-Z9003
	2SA1015								
Q6	2SA1094Y	Y422306000(3)	ECG34	GEVR-100	MC78L05CP	NTE34	SK3462/977		221-Z9044
	14305		ECG977	GEVR-100	MC78L05CP	NTE977	SK3462/977		
SR1	UPC14305	X440063050	ECG977	GEVR-100	MC78L05CP	NTE977	SK3591/960		221-Z9044
	UA7805C		ECG960	GEVR-102	MC7805CT	NTE960	SK3591/960		
ZD1	HZ12C-3	X330000200							221-Z9043
ZD2	HZ7B-3	X330000130							221-Z9044
	HZ15-3	X330000210							
ZD3	HZ27-1	X330000230							221-Z9044
	HZ5C-1	X333000070							
ZD4	HZ74LS175P		ECG74LS175		SN74LS175N	NTE74LS175N	SK74LS175		HE-443-752
	LS175	X420301750	ECG74LS175		SN74LS175N	NTE74LS175N	SK74LS175		

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### SEMICONDUCTORS (Select replacement for best results)(cont)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						ZENITH PART No.
			ECG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	
1B	HN462716G-HM1-C2								
1C	2716-HM1-C2	Y426800101							
	2332/2716								
	D8039LC	X400080390							
2A	8039								
	8039/8049								
	HD74LS175P								
2B	LS175	X420301750	ECG74LS175 ECG74LS175		SN74LS175N SN74LS175N	NTE74LS175N NTE74LS175N	SK74LS175 SK74LS175		HE-443-752 HE-443-752
	HN462716G-HM2-C2								
	2716-HM2-C2	Y426800102							
2C	2716								
	HD74LS32P								
	HD74LS00P	X420300320	ECG74LS32		SN74LS32N	NTE74LS32	SK74LS32		HE-443-875
3A	HD74LS367AP	X420300000	ECG74LS00		SN74LS00N	NTE74LS00	SK74LS00		HE-443-728
	LS367	X420303670	ECG74LS367 ECG74LS367		SN74LS367AN SN74LS367AN	NTE74LS367 NTE74LS367	SK74LS367 SK74LS367		HE-443-857 HE-443-857
3B	MB8516-HM3-F0								
	2716-HM3-F0	Y424800104							
	2716								
3C	HD74LS04P								
	HD14093BP	X420300040	ECG74LS04		SN74LS04N	NTE74LS04	SK74LS04		HE-443-755
	TC4093BP	X460409300	ECG4093B ECG4093B	MC14093BCP MC14093BCP		NTE4093B NTE4093B	SK4093B SK4093B		HE-443-758 HE-443-758
4A	HD74LS367AP								
	LS367	X420303670	ECG74LS367 ECG74LS367		SN74LS367AN SN74LS367AN	NTE74LS367 NTE74LS367	SK74LS367 SK74LS367		HE-443-857 HE-443-857
5E	UPA2003C	X440040030							
	TD62504P								
	TD62504	X440045040							
6D	HD74LS05P	X420300050	ECG74LS05		SN74LS05N	NTE74LS05	SK74LS05		HE-443-818

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### SEMICONDUCTORS (Select replacement for best results) (cont)

REPLACEMENT DATA									
ITEM No.	TYPE No.	MFGR. PART No.	EGG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
6E 7B	HD74LS02P	X420300020	EGG74LS02		SN74LS02N	NTE74LS02	SK74LS02		HE-443-779
	TD62504P	X440045040							
	TD62504	X420100060	EGG7406	GE-7406		NTE7406	SK7406		HE-443-698
	HD7406P								
7D	HD74LS05P	X420300050	EGG74LS05		SN74LS05N	NTE74LS05	SK74LS05		HE-443-818
7E 8B	HD74LS04P	X420300040	EGG74LS04		SN74LS04N	NTE74LS04	SK74LS04		HE-443-755
	D8155C								
	8155	X400081550							
9B	D8041C-591								
	8041-591	Y422800203							
	8041								
DRIVER BOARD									
D1 thru D14	S5277B	X320010240	EGG552	GE-511		NTE552	SK9000/552	WEP172/506	103-287
D15	1S2075K	X320010070	EGG519	GE-514	1N4935	NTE519	SK3100/519	WEP925/519	103-131
D16 thru D23		X320010080							
DM1,2	DA0601								
Q1 thru Q17	2SD986L						SK9370		
	2SD986	X303098600					SK9370		
Q18 thru Q20	2SB772Q		EGG185	GE-58	2N5194	NTE185	SK9042/374	WEP883/185	
	2SB743Q	X301077251	EGG185	GE-58	2N5194	NTE185	SK9042/374	WEP883/185	
ZD1 thru ZD6	AU01-24	X330020020	EGG5137A	GE 5ZD-24	1N5359B	NTE5137A	SK24X/5137A	WEP1631/5137	103-248
ZD7	H25C-1	X330000070							
1A	NE555P		EGG955M	GE IC-269	MC1455P1	NTE955M	SK3564/955M	WEP2119/955M	221-Z9042
	555	X440095550	EGG955M	GE IC-269	MC1455P1	NTE955M	SK3564/955M	WEP2119/955M	221-Z9042

\* Lead configuration may vary from original.

- (1) Home Position Sensor assembly, includes P.C. Board.
- (2) Position Timing Signal assembly, includes P.C. Board.
- (3) Assembly includes cables, capacitor and connectors.

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C1	6800 50V	X202546820
C2	6800 16V	X202246820
C3	2200 25V 20%	X200302220
C4	10 16V 20%	X200201000
C5	10 35V 20%	X200401000
C6	3.3 50V 20%	X200500330
C7	3.3 50V 20%	X200500330

ITEM No.	RATING	MFGR. PART No.
C17	10 35V 20%	X200401000
C22	10 35V 20%	X200401000
<b>DRIVER BOARD</b>		
C1	10 16V	X200201000
C2	10 16V	X200201000

### CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C1A	.1 250V	X220201031
C1B	.01 50V	
C2A	.0047 125VAC	
C3A	.0047 125VAC	
C8	.001 50V 10%	
C9	.0015 50V 10%	X220201520
C10	.0015 50V 10%	X220201520
C11	.0047 50V 10%	X220204720
C12	10 50V 10%	X221201006
C13	10 50V 10%	X221201006
C14	10 50V 10%	X221201006
C15	10 50V 10%	X221201006
C16	.1 50V	X220201031
C18	.01 50V	
C19	.01 50V	
C20	.01 50V	
C21	.01 50V	
C23	.01 50V	
C24	.01 50V	
C25	.01 50V	
C26	.01 50V	

ITEM No.	RATING	MFGR. PART No.
C27	.01 50V	X220201031
C28	.01 50V	X220201031
C29	.01 50V	X220201031
C30	.01 50V	X220201031
C31	.01 50V	X220201031
C32	.01 50V	X220201031
C33	.01 50V	X220201031
C34	.01 50V	X220201031
C35	.01 50V	X220201031
<b>DRIVER BOARD</b>		
C3	.1 50V 10%	X230011042
C4	.001 50V 10%	X230011022
C5	.01 50V	X220201031
C6	.01 50V	X220201031
C7	.01 50V	X220201031
C8	.01 50V	X220201031
C9	.01 50V	X220201031
C10	.01 50V	X220201031

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## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
<b>DRIVER BOARD</b>				
VR1	Pulse Width	20K	X180040040	

### RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	WORKMAN PART No.	REMARKS
RM1	Resistor Network	X110851030(3)		
RM2	Resistor Network	X110851030(3)		
RM3	Resistor Network	X110803320(1)		
RM4	Resistor Network	X110803320(1)		
RM5	Resistor Network	X110863320(4)		
RM6	Resistor Network	X110881030(5)		
<b>DRIVER BOARD</b>				
R12	120 5% 5W WW	X160321210		
R13	120 5% 5W WW	X160321210		
RM1	Resistor Network	X110803320(1)		
RM2	Resistor Network	X110881220(2)		

- (1) Contains ten, 3300 10% 1/8W, resistors.  
 (2) Contains eight, 1200 10% 1/8W, resistors.  
 (3) Contains five, 10K 10% 1/8W, resistors.  
 (4) Contains six, 3300 10% 1/8W, resistors.  
 (5) Contains eight, 10K 10% 1/8W, resistors.

### TRANSFORMER (Power)

ITEM No.	RATING			REPLACEMENT DATA		
				MFGR. PART No.	THORDARSON PART No.	NOTES
T1	PRI.	SEC. 1	SEC. 2	Y422501100 MP-80U-a(1)		
	120VAC @ 410mAAC	16.63VAC @ 180mADC	9.83VAC			
	SEC. 3	SEC. 4	SEC. 5			
	10.33VAC @ 560mADC	25.8VAC @ 650mADC				

(1) Number on unit.



## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA				NOTES
		MFR. PART No.		BUSS PART No.		
		DEVICE	HOLDER	DEVICE	HOLDER	
F1	2A @ 250V Fast-Acting	X502060020				

### MISCELLANEOUS

ITEM No.	PART NAME	MFR. PART No.	NOTES
BZ1	Buzzer	X503000020	
CR1	Crystal	X504000200	6MHz
CR2	Crystal	X504000200	6MHz
FM1	Motor	Y426501000	Fan Motor Unit
H1	Print Head	F401500000	
LED1	LED	X350200010	Power, Grn (2.00V @ 12mA)
LED2	LED	X350200010	Ready, Grn (2.00V @ 11mA)
LED3	LED		No Paper, Red (1.67V @ 12mA)
LED4	LED	X350200010	On Line, Grn (2.00V @ 11mA)
M1	Motor	F303027000	Timing Belt Motor Assembly C
M2	Motor	F303031000	Paper Feed Motor Assembly A
P1	Power Cord	Y422301001	AC, Polarized
SW1	Switch	X620400810	Print Status
SW1A	Switch	X620100060	Power On
SW2	Switch	X620400410	Line Feed Status
SW2A	Switch	X620100060	Form Feed
SW3	Switch	X620100060	Line Feed
SW10	Switch		Master Power
SW101	Switch	A170202502	Paper End
	Mechanism	Y426590000	Printer (Model-3360)
	P.C. Board	Y422204500	AC Switch (MFIL)
	P.C. Board	Y426202000	Control (HMTP)
	P.C. Board	Y422202000	Driver (MDRI)
	P.C. Board	Y422203000	Function (MPEL)
	P.C. Board	F303009010	Paper End
	P.C. Board	F310012000	Paper End Assembly (Includes SW101)
	P.C. Board	F310055000	Terminal

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### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Lower Case	Y426000000	Printer Cover A	Y426006001
Upper Case	Y426003001	Separator	Y426024001
Base Plate	Y426023001	Paper Guide Roller	Y426025001
Fuse Cover B	Y422028001	Roller Holder	Y426029001
Dust Cover L	Y426012101	Dust Cover U	Y426012001
Control Panel A	Y427043001	Release Lever Cap	Y426013001
Knob	Y422015001	Gear Cover	Y423047001
Knob Spring	X510360010		

### WIRING DATA

Shielded Hook-up Wire ..... Use BELDEN No. 8401 or 8421 (Single-Conductor)  
8208 (Two-Conductor)  
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8529 (Solid) Available in 13 Colors  
8522 (Stranded) Available in 13 Colors

## LOGIC

PIN NO.	IC 1A	IC 1B	PIN NO.	IC 1C	PIN NO.	IC 1C	PIN NO.	IC 2A	IC 2B	IC 2C	IC 2E	IC 3A	IC 3B	IC 3C	IC 3E
1	H	P	1	H	21	P	1	H	P	*	H	H	P	H	H
2	P	P	2	P	22	P	2	H	P	*	H(9)	H	P	L	H
3	P	P	3	P	23	P	3	L	P	H	L	P	P	L	L
4	P	H	4	H	24	H(9)	4	P	H	P	H(9)	H	H	L	L
5	P	P	5	H	25	H	5	P	P	P	L	P	P	H	H
6	P	P	6	H	26	H	6	P	P	H	H	H	P	L	H
7	P	P	7	L	27	H(8)	7	P	P	L	L	P	P	L	L
8	L	P	8	P	28	H(10)	8	L	P	P	H	L	P	H	H(1)
9	P	P	9	P	29	H	9	P	P	P	H	P	P	L	H(1)
10	P	P	10	H(1)	30	H(10)	10	P	P	P	L	H	P	P	L(1)
11	P	P	11	P	31	L(6)	11	P	P	H	H	P	P	P	L(5)
12	P	L	12	P	32	H	12	P	L	*	L	H	L	L	H(4)
13	P	P	13	P	33	L(7)	13	P	P	*	L	P	P	H	H(4)
14	P	P	14	P	34	H	14	P	P	H	H	H	P	H	H
15	P	P	15	P	35	H	15	P	P			H	P		
16	H	P	16	P	36	L(1)	16	H	P			H	P		
17		P	17	P	37	H(1)	17		P				P		
18		L	18	P	38	H(8)	18		H				H(9)		
19		P	19	P	39	L(1)	19		P				P		
20		P	20	L	40	H	20		P				P		
21		H					21		H				H		
22		P					22		P				P		
23		P					23		P				P		
24		H					24		H				H		

PIN NO.	IC 4A	IC 5E
1	P	L(3)
2	L	*(8)
3	P	H(8)
4	H(2)	H(15)
5	P	L
6	H	L(14)
7	P	L(13)
8	L	L
9	P	H
10	H	H(10)
11	P	H(12)
12	L	H(10)
13	P	L(16)
14	L	L(7)
15	H	L(7)
16	H	H(2)

## LOGIC (DRIVER BOARD)

PIN NO.	IC 1A	PIN NO.	IC 1A	PIN NO.	IC 1A	PIN NO.	IC 1A
1	L	3	L(1)	5	H	7	L
2	H(1)	4	H	6	L	8	H

NOTE: Logic probe readings taken with printer On Line and not printing unless otherwise noted. Printer Self-Test mode used to get readings with switches SW1 and SW2 set as shown on schematic.

### Logic Probe Display

L = Low

H = High

P = Pulse

\* = Open (No lights On)

- (1) Probe indicates P when printer is printing.
- (2) Probe indicates L with no paper in printer.
- (3) Probe indicates H with no paper in printer.
- (4) Probe indicates L when print head is not at home position.

- (5) Probe indicates H when print head is not at home position.
- (6) Probe indicates H when print head moves from left to right, and L when head moves from right to left.
- (7) Probe indicates H when the printer is not on line.
- (8) Probe indicates L when the printer is not on line.
- (9) Probe indicates P when the printer is not on line or is printing.
- (10) Probe indicates L when printer is printing.
- (12) Probe indicates L when a line feed occurs.
- (13) Probe indicates H when printing.
- (14) Probe indicates H when a line feed occurs.
- (15) Probe indicates L when buzzer sounds.
- (16) Probe indicates H when buzzer sounds.

## LOGIC (Continued)

PIN NO.	IC 6B	IC 6D	IC 6E	IC 7B	IC 7C	IC 7D	IC 7E	PIN NO.	IC 8B	PIN NO.	IC 8B	PIN NO.	IC 9B	PIN NO.	IC 9B
1	L(1)	H(12)	H(8)	H(1)	L	L(11)	H(1)	1	L(7)	21	H	1	L(1)	21	H(10)
2	L	L(14)	L	H(1)	H	*(11)	L(1)	2	H(1)	22	H	2	P	22	H(10)
3	L	H(10)	L(7)	H(1)	L	H(11)	H(11)	3	L(1)	23	H	3	P	23	L(6)
4	L	L(13)	H(8)	H(1)	H	L(11)	L(11)	4	L	24	H	4	H	24	H
5	L	H(2)	L(7)	H(1)	L(7)	L(1)	L(1)	5	L	25	H	5	H	25	H
6	H(1)	L(3)	L(7)	H(1)	H(8)	*(1)	H(1)	6	H	26	H	6	P	26	H
7	H(1)	L	L	H(1)	L	L	L	7	L(1)	27	H	7	L	27	H(1)
8	L	L(1)	H(10)	L	L(3)	L(1)	L(11)	8	H(9)	28	H	8	P	28	L(1)
9	*	H(1)	L(17)	*	H(2)	H(1)	H(11)	9	P	29	H(1)	9	L(1)	29	H(10)
10	L(1)	*(1)	L(13)	L(1)	L(7)	L(11)	L(7)	10	H(1)	30	H(1)	10	H(1)	30	L(17)
11	L(1)	L(1)	H	L(1)	H(8)	H(11)	H(8)	11	P	31	H(1)	11	P	31	H(11)
12	*	L	L	L(1)	H	*(11)	L	12	P	32	H(1)	12	P	32	H(11)
13	*	*	L	L(1)	L	L(11)	H(8)	13	P	33	H(1)	13	P	33	H(12)
14	*	H	H	L(1)	H	H	H	14	P	34	H(1)	14	P	34	H(15)
15	*			L(1)				15	P	35	H(1)	15	P	35	L
16	H(1)			L(1)				16	P	36	H(1)	16	P	36	L
17								17	P	37	L	17	P	37	L
18								18	P	38	L	18	P	38	H
19								19	P	39	H	19	P	39	L(5)
20								20	L	40	H	20	L	40	H

NOTE: Logic probe readings taken with printer On Line and not printing unless otherwise noted. Printer Self-Test mode used to get readings with switches SW1 and SW2 set as shown on schematic.

### Logic Probe Display

L = Low

H = High

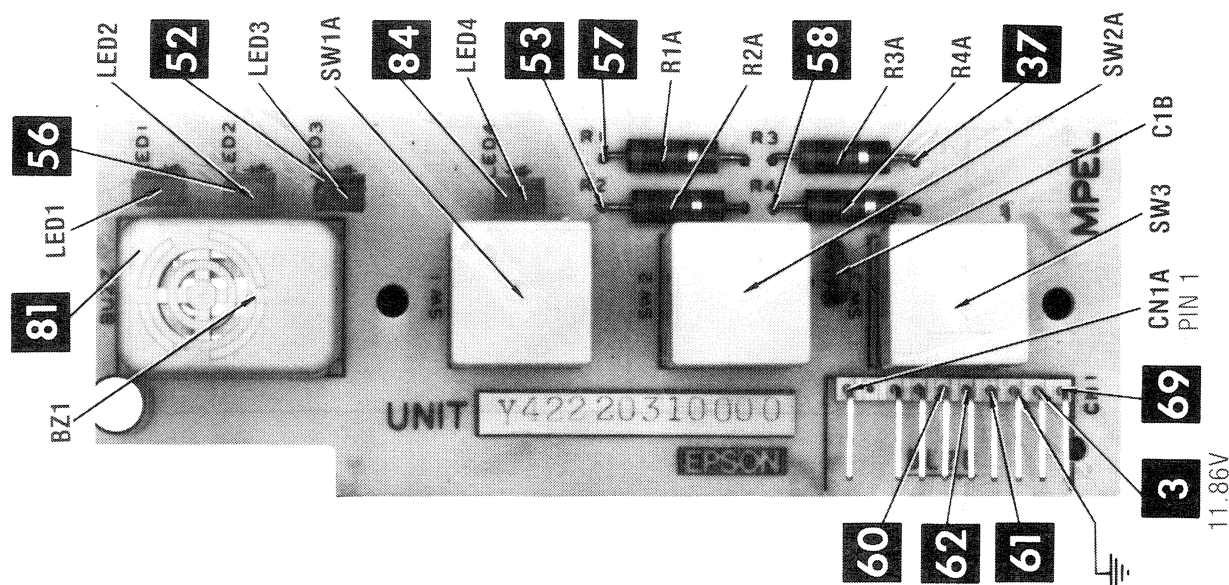
P = Pulse

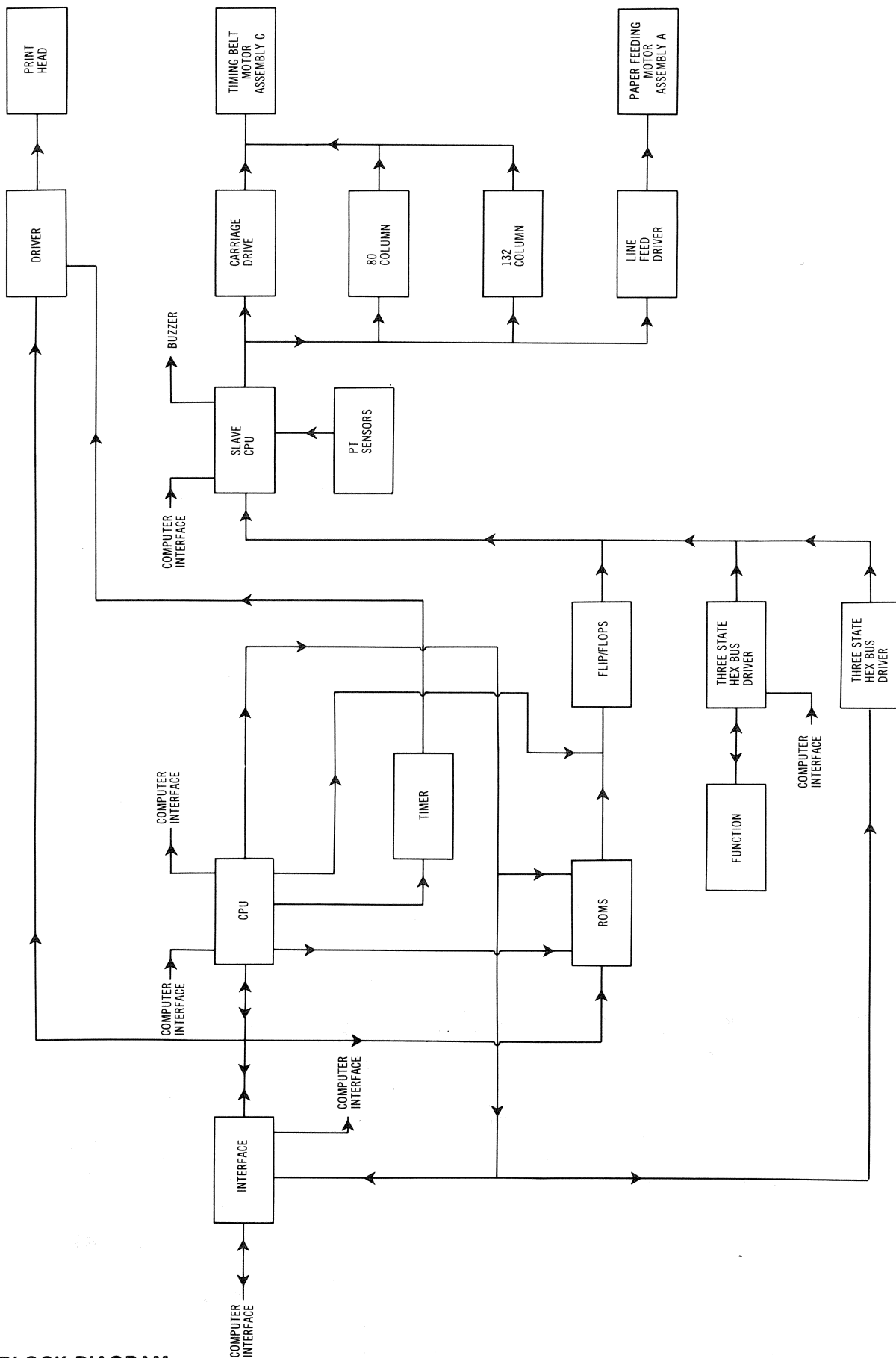
\* = Open (No lights On)

- (1) Probe indicates P when printer is printing.
- (2) Probe indicates L with no paper in printer.
- (3) Probe indicates H with no paper in printer.
- (5) Probe indicates H when print head is not at home position.

- (6) Probe indicates H when print head moves from left to right, and L when head moves from right to left.
- (7) Probe indicates H when the printer is not on line.
- (8) Probe indicates L when the printer is not on line.
- (9) Probe indicates P when the printer is not on line or is printing.
- (10) Probe indicates L when printer is printing.
- (11) Probe indicates P when a line feed occurs.
- (12) Probe indicates L when a line feed occurs.
- (13) Probe indicates H when printing.
- (14) Probe indicates H when a line feed occurs.
- (15) Probe indicates L when buzzer sounds.
- (17) Probe indicates H when printing in compressed mode.

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## SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install boards, mechanical or electrical parts, or other peripherals with printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This printer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The printer cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the printer to water. If exposed to water turn the unit Off. Do not place the printer near possible water sources.
14. Never leave the printer unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning printer.
17. Never use liquids or aerosols directly on the printer. Spray on cloth and then apply to the printer cabinet. Make sure the printer is disconnected from the AC power line.

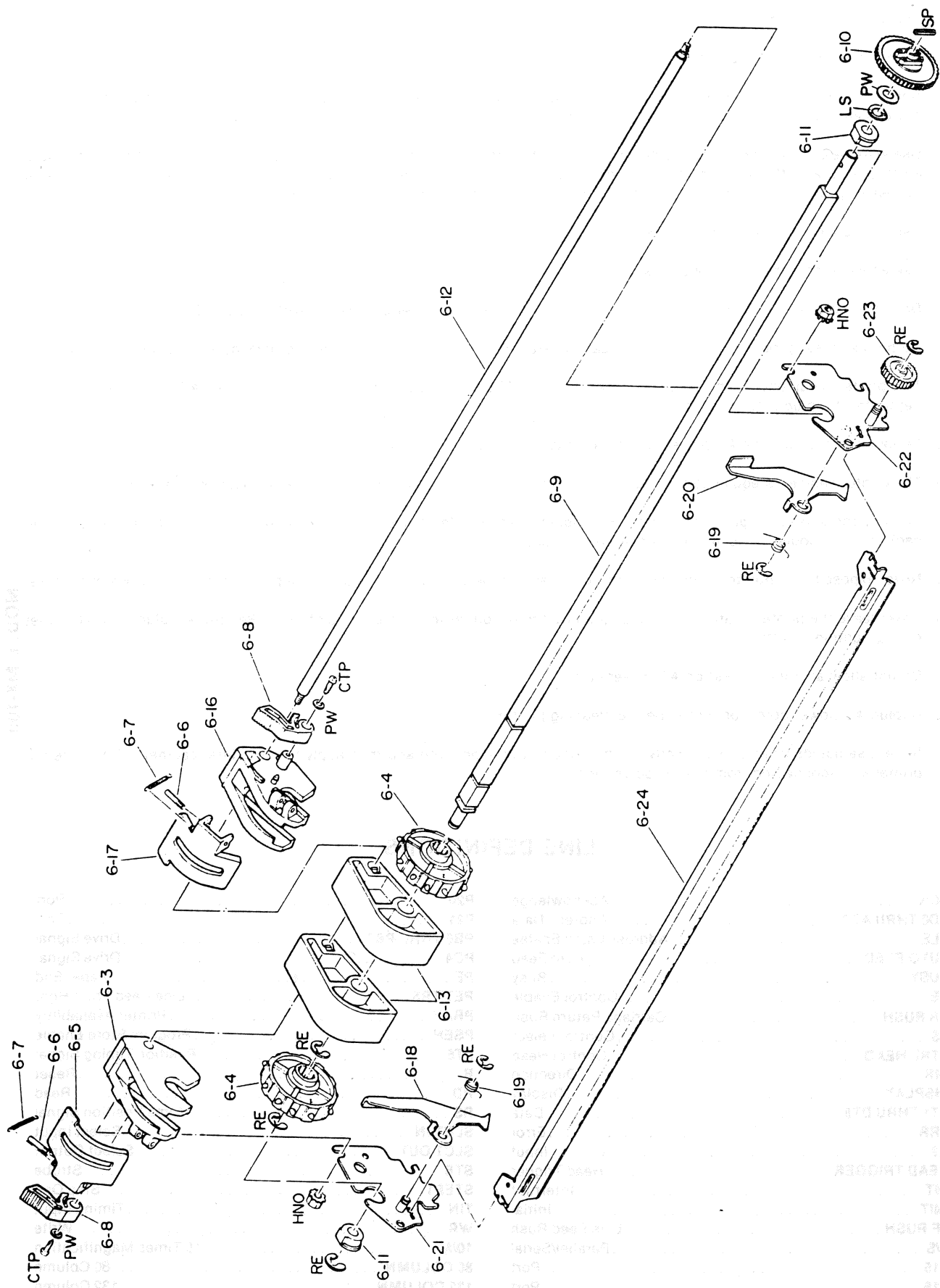
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## LINE DEFINITIONS

<b>ACK</b> .....	Acknowledge	<b>P20</b> .....	Port
<b>AD0 THRU AD7</b> .....	Address Data	<b>P21</b> .....	Port
<b>ALE</b> .....	Address Latch Enable	<b>PB0 THRU PB7</b> .....	Drive Signal
<b>AUTO FEED</b> .....	Auto Feed	<b>PC4</b> .....	Drive Signal
<b>BUSY</b> .....	Busy	<b>PE</b> .....	Paper End
<b>CE</b> .....	Control Enable	<b>PET/TRS</b> .....	Line Feed From Host
<b>CR RUSH</b> .....	Carriage Return Rush	<b>PRAV</b> .....	Printer Availabilty
<b>CS</b> .....	Control Select	<b>PSEN</b> .....	Program Store Enable
<b>CTRL HEAD</b> .....	Control Head	<b>PTS</b> .....	Position Timing Signal
<b>DIR</b> .....	Direction	<b>R</b> .....	Reset
<b>DISPLAY</b> .....	Display	<b>RD</b> .....	Read
<b>DT1 THRU DT8</b> .....	Data	<b>RS</b> .....	Home Position Signal
<b>ERR</b> .....	Error	<b>SLCT IN</b> .....	Select Input
<b>G2</b> .....	Input	<b>SLCT OUT</b> .....	Select Output
<b>HEAD TRIGGER</b> .....	Head Trigger	<b>STB</b> .....	Strobe
<b>INT</b> .....	Interrupt	<b>STEP1</b> .....	Step One
<b>INIT</b> .....	Initial	<b>TIN</b> .....	Timing Input
<b>LF RUSH</b> .....	Line Feed Rush	<b>WR</b> .....	Write
<b>P/S</b> .....	Parallel/Serial	<b>10/M</b> .....	10 Times Magnification
<b>P15</b> .....	Port	<b>80 COLUMN</b> .....	80 Column
<b>P16</b> .....	Port	<b>132 COLUMN</b> .....	132 Column

Any Bar above any alphabetical or numerical combination indicates line active in a low (0) state.





# TRACTOR FEED

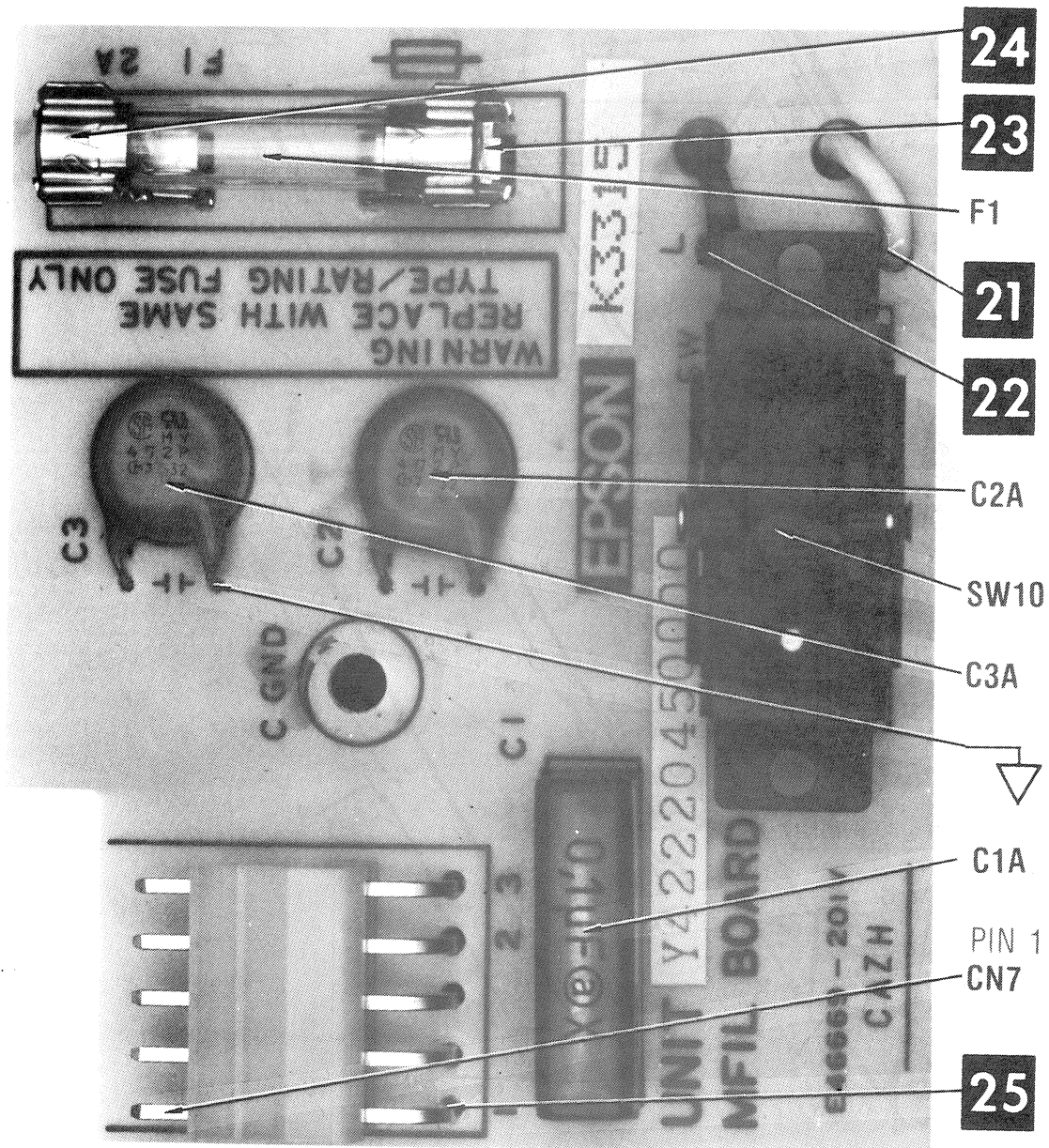
Courtesy of Epson America, Inc.

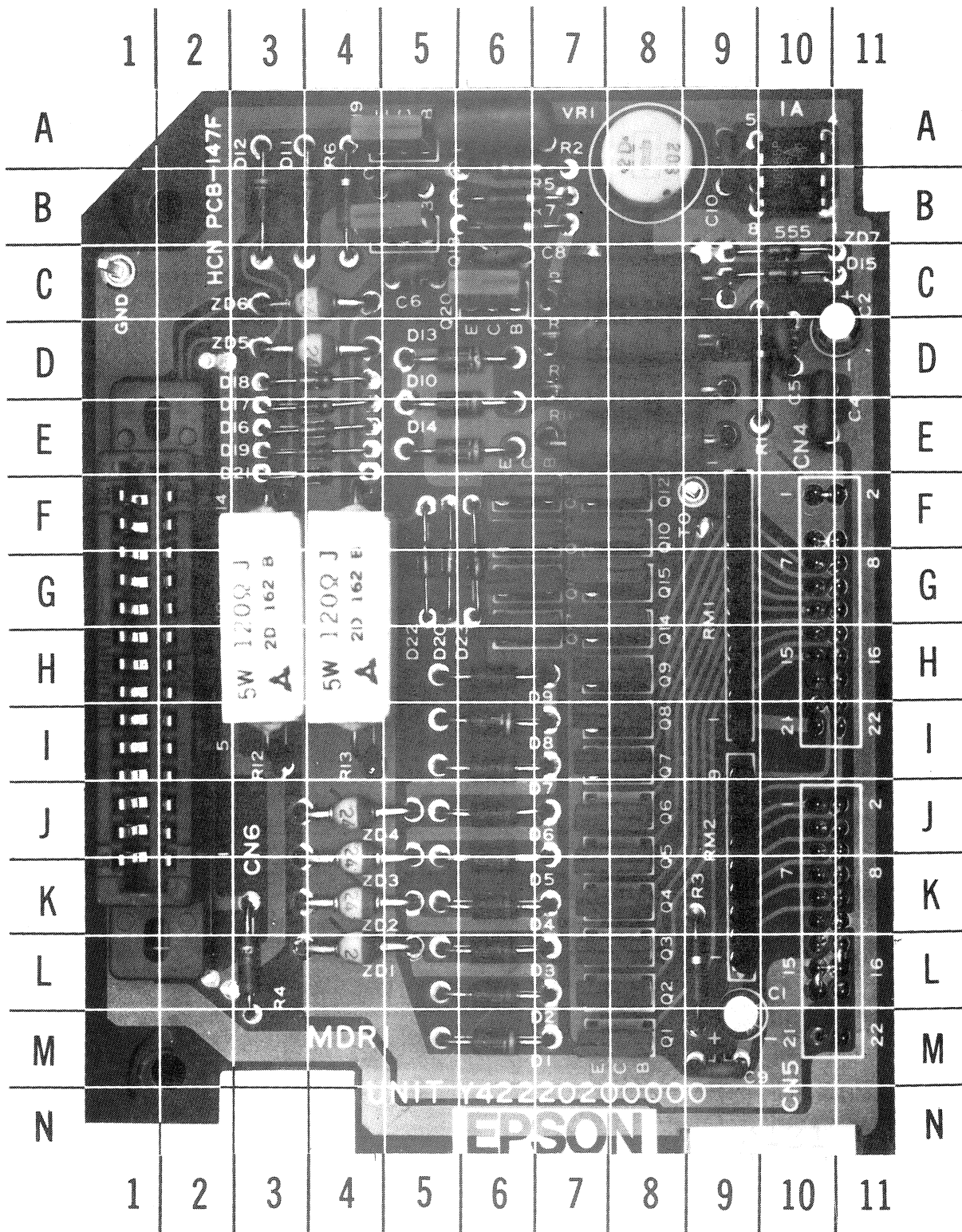


## PRINTER MECHANISM

## DRIVER BOARD GridTrace LOCATION GUIDE

C1	M-9	D5	K-6	D22	G-5	Q16	G-6	R13	G-4
C2	D-11	D6	J-6	D23	G-6	Q17	H-6	RM1	G-9
C3	A-6	D7	I-6	Q1	M-7	Q18	B-5	RM2	K-9
C4	E-10	D8	I-6	Q2	L-7	Q19	A-5	T0	F-9
C5	D-10	D9	H-6	Q3	L-7	Q20	C-6	VR1	A-8
C6	C-5	D10	E-6	Q4	K-7	R1	D-10	ZD1	L-4
C7	B-5	D11	B-4	Q5	K-7	R2	A-6	ZD2	K-4
C8	C-6	D12	B-3	Q6	J-7	R3	L-9	ZD3	J-4
C9	M-9	D13	D-6	Q7	I-7	R4	L-3	ZD4	J-4
C10	A-9	D14	E-6	Q8	I-7	R5	B-6	ZD5	C-4
CN4	G-10	D15	C-10	Q9	H-7	R6	B-4	ZD6	C-4
CN5	K-10	D16	E-4	Q10	F-7	R7	B-6	ZD7	C-10
CN6	H-1	D17	E-4	Q11	F-6	R8	C-8	1A	A-10
D1	M-6	D18	D-4	Q12	F-7	R9	D-8		
D2	L-6	D19	E-4	Q13	F-6	R10	E-8		
D3	L-6	D20	G-5	Q14	G-7	R11	D-8		
D4	K-6	D21	F-4	Q15	G-7	R12	G-3		



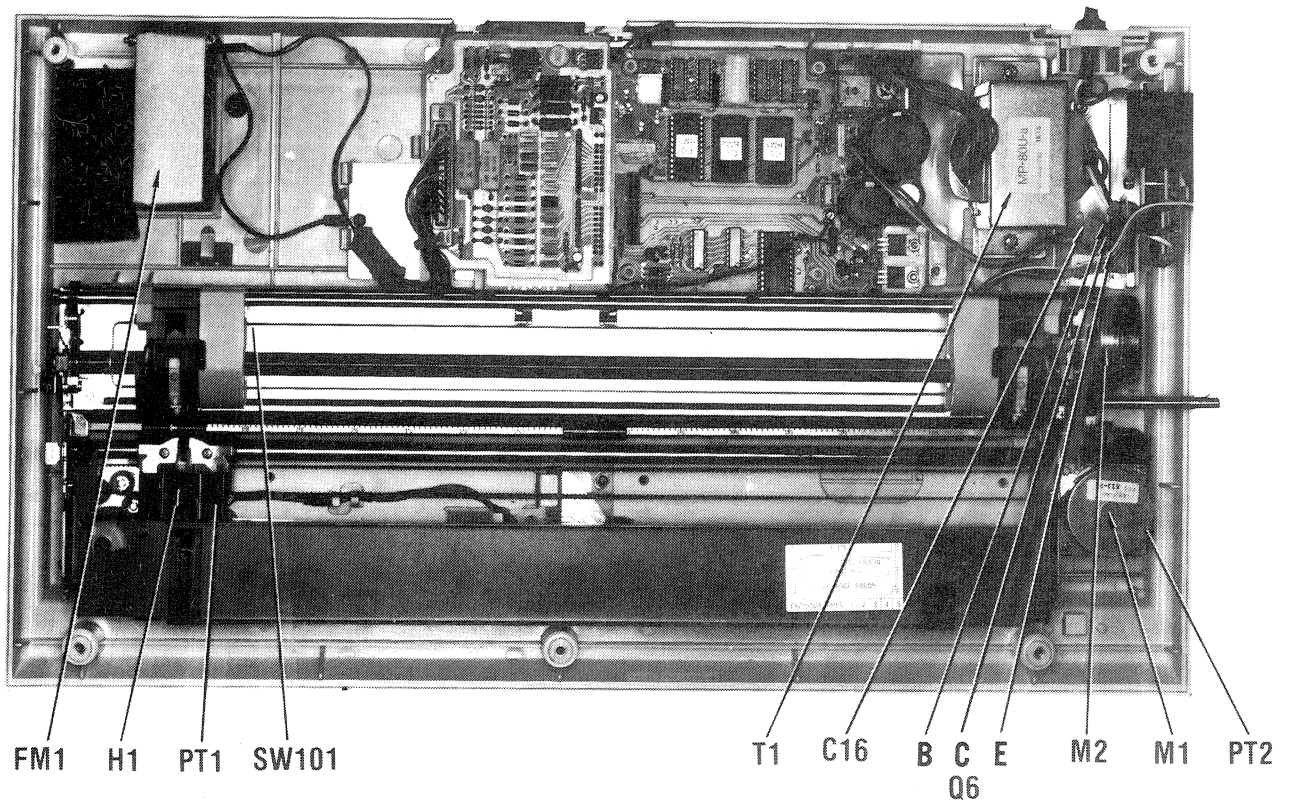


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## CONTROL BOARD GridTrace LOCATION GUIDE

C1	C-15	C29	E-5	R2	C-13	R29	G-6	ZD3	G-14
C2	C-14	C30	D-2	R3	H-13	R30	D-5	ZD4	D-13
C3	E-15	C31	B-1	R4	H-15	R31	B-12	ZD5	I-8
C4	G-13	C32	I-2	R5	F-13	R32	I-5	1A	A-12
C5	G-13	C33	I-7	R6	F-13	R33	E-6	1B	C-11
C6	I-7	C34	I-7	R7	B-13	R34	F-7	1C	G-11
C7	H-9	C35	I-15	R8	G-8	R35	B-2	2A	A-11
C8	D-13	CN1	A-4	R9	I-10	R36	B-2	2B	C-10
C9	G-8	CN2	A-13	R10	G-8	R37	B-2	2C	F-10
C10	I-7	CN3	E-7	R11	G-8	R38	H-14	2E	H-10
C11	H-10	CN4	D-6	R12	G-8	R39	I-8	3A	A-9
C12	H-13	CN5	F-6	R13	H-8	R40	I-8	3B	C-8
C13	H-13	CN6	C-13	R14	G-8	R41	I-8	3C	F-9
C14	F-1	CR1	I-13	R15	I-8	R42	I-14	3E	I-9
C15	F-1	CR2	F-2	R16	H-12	R43	I-7	4A	A-8
C17	D-13	D1	G-6	R17	H-12	R44	E-15	5E	I-6
C18	H-15	D2	I-15	R18	B-2	RM1	B-9	6B	D-5
C19	F-14	DB1	B-14	R19	H-13	RM2	B-8	6D	G-5
C20	G-14	DB2	B-15	R20	H-13	RM3	A-4	6E	I-4
C21	G-14	DB3	B-15	R21	H-13	RM4	B-2	7B	D-4
C22	E-13	J1	G-12	R22	I-9	RM5	H-5	7C	E-4
C23	B-12	Q1	E-13	R23	E-4	RM6	C-2	7D	G-4
C24	C-12	Q2	G-15	R24	I-14	SR1	F-15	7E	I-4
C25	H-12	Q3	I-15	R25	H-13	SW1	A-10	8B	D-3
C26	A-7	Q4	H-14	R26	I-5	SW2	B-7	9B	D-2
C27	D-7	Q5	F-5	R27	G-6	ZD1	C-13		
C28	G-7	R1	C-13	R28	G-6	ZD2	I-15		

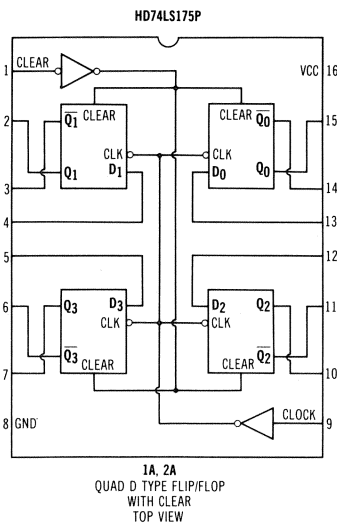


CHASSIS-TOP VIEW

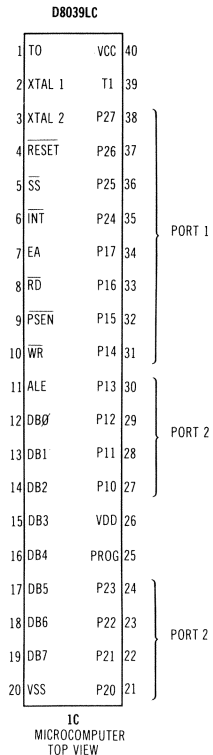
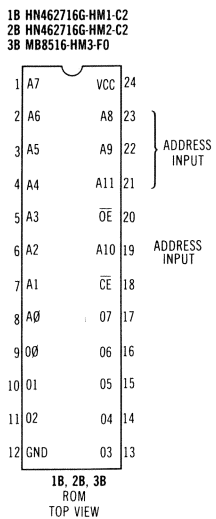
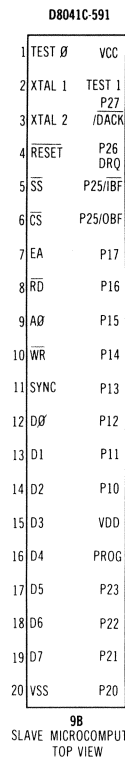
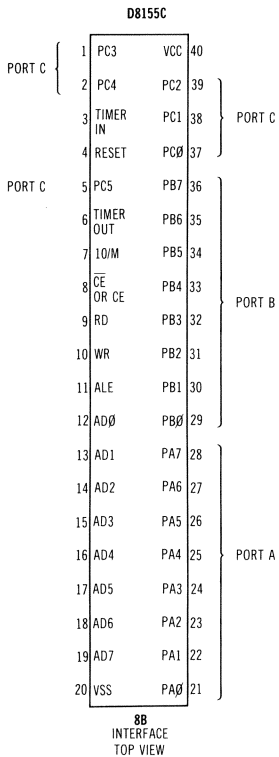
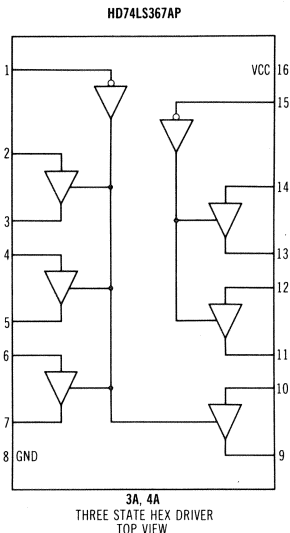




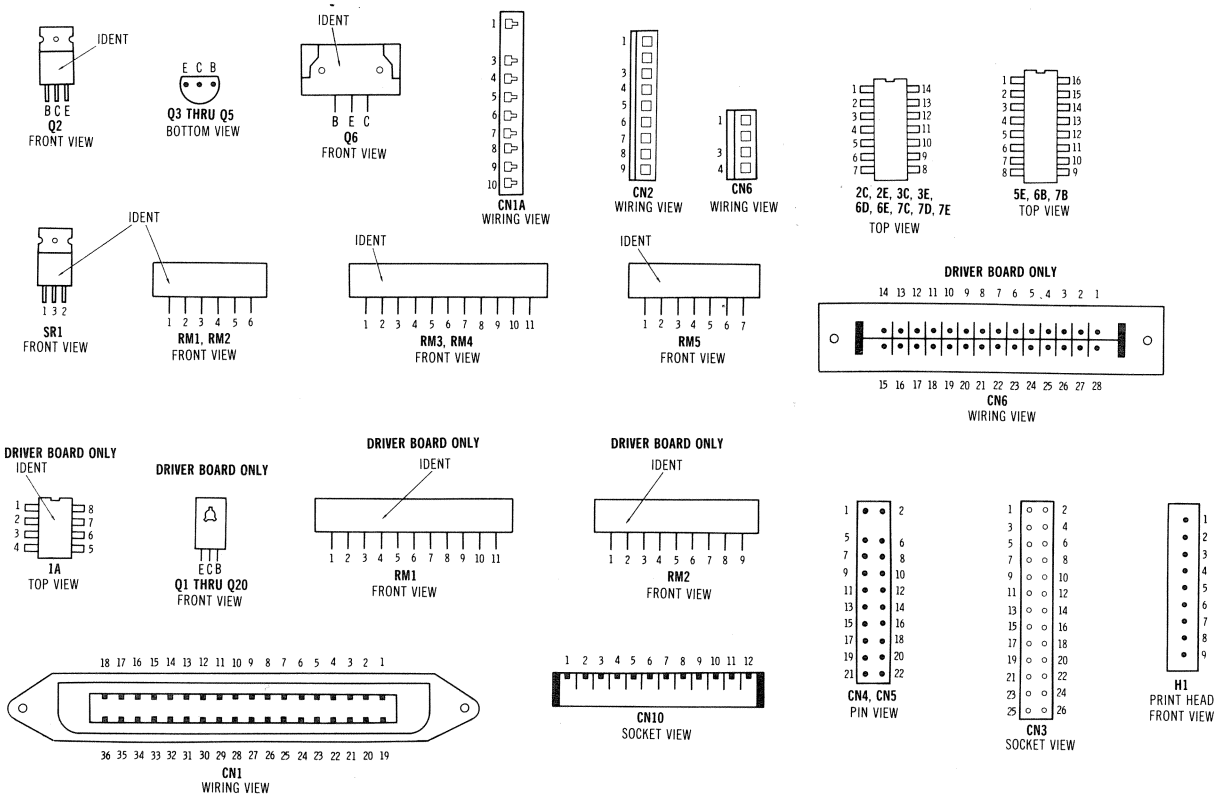
IC PINOUTS, TERMINAL GUIDES & SCHEMATIC NOTES



PINOUTS



TERMINAL GUIDES



SCHEMATIC NOTES

NOTE: Logic probe readings taken with printer On Line and not printing unless otherwise noted. Printer Self-Test mode used to get readings with switches SW1 and SW2 set as shown on schematic.

- Circuitry not used in some versions
  - - - Circuitry used in some versions
  - ⊕ See parts list
  - ⊕ Ground
  - ▽ Common tie point
- Voltages measured with digital meter.  
Waveforms and voltages are taken from ground, unless noted otherwise.  
Voltages, waveforms and logic readings taken with printer On Line and not printing unless noted. Printer Self-Test mode used to get readings taken while printing.  
Switches SW1 and SW2 set as shown on schematic.  
Waveforms taken with triggered scope and Sweep/Time switch in Calibrate position, scope input set for DC coupling on "0" reference voltage waveforms. Switch to AC input to view waveforms after DC reference is measured when necessary. Each waveform is 7.5cm width with DC reference voltage given at the bottom line of each waveform. Time in  $\mu$ s per cm, given with p-p reading at the end of each waveform.  
Item numbers in rectangles appear in the alignment/adjustment instructions.  
Supply voltage maintained as shown at input.  
Controls adjusted for normal operation.  
Terminal identification may not be found on unit.  
Resistors are  $\frac{1}{2}$ W or less, 10% unless noted.  
Value in ( ) used in some versions.

- Logic Probe Display  
L = Low  
H = High  
P = Pulse  
\* = Open (No lights On)
- (1) Probe indicates P when printer is printing.
  - (2) Probe indicates L with no paper in printer.
  - (3) Probe indicates H with no paper in printer.
  - (4) Probe indicates L when print head is not at home position.
  - (5) Probe indicates H when print head is not at home position.
  - (6) Probe indicates H when print head moves from left to right, and L when head moves from right to left.
  - (7) Probe indicates H when the printer is not on line.
  - (8) Probe indicates L when the printer is not on line.
  - (9) Probe indicates P when the printer is not on line or is printing.
  - (10) Probe indicates L when printer is printing.
  - (11) Probe indicates P when a line feed occurs.
  - (12) Probe indicates L when a line feed occurs.
  - (13) Probe indicates H when printing.
  - (14) Probe indicates H when a line feed occurs.
  - (15) Probe indicates L when buzzer sounds.
  - (16) Probe indicates H when buzzer sounds.
  - (17) Probe indicates H when printing in compressed mode.



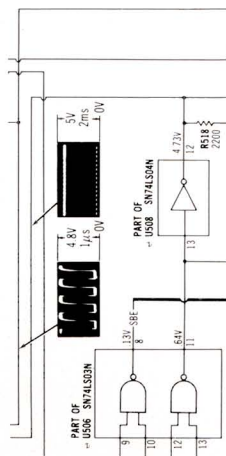


# SAYS

**COMPUTERFACTS™** put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

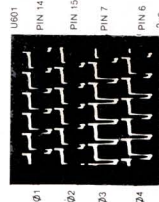
The following information is just a sample of the many valuable time saving features contained in this exclusive Sams COMPUTERFACTS publication:

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUIT TRACE<sup>®</sup>, GRID TRACE<sup>™</sup>, waveforms, voltages and stage identification.



- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

## TROUBLESHOOTING



## MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the

- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

## SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFR PART No.	REPLACEMENT DATA						ZENITH PART No.
			EGG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	
D102	15553	1149-2576	EG3519	GE-514	1N4935	NTE519	SK9091/177	MEF925/519	103-131
D103	1N60FM	1149-2577	EG3519	GE-514	1N4935	NTE519	SK9091/177	MEF925/519	103-131
D201	1N4004GP	1201-4209	EG3516	GE-504A	1N4004	NTE116	SK3312	MEF157	212-76-02
D501 thru D503	15553	1149-2576	EG9519	GE-514	1N4935	NTE519	SK9091/177	MEF925/519	103-131

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CP2

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- Logic Chart containing logic probe readings to isolate defective circuitry and components.

## LOGIC

[illegible]

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